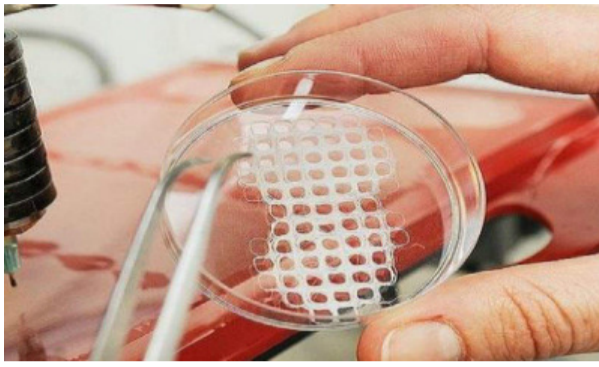


Health Matters

Static electricity enhance biomedical implant durability

Medical technology innovations achieved by integrating science and medicine have improved the quality of life for patients. Especially noteworthy is the emergence of electronic devices implanted in the body, such as in the heart or brain, which enable real-time measurement and regulation of physiological signals, presenting new solutions for challenging conditions like Parkinson's disease. However, technical constraints have hindered the semi-permanent use of electronic devices after their implantation. A collaborative research team led by Professor Sang-Min Park

from the Departments of Convergence IT Engineering, Mechanical Engineering, and Electrical Engineering, and the School of Interdisciplinary Bioscience and Bioengineering at POSTECH, alongside Jiho Lee, enrolled in the MS/PhD programme, and Professor Sang-Woo Kim from Yonsei University's Department of Materials Science and Engineering, together with Dr. Young-Jun Kim and MS/PhD student Joon-Ha Hwang from Sungkyunkwan University, has achieved a groundbreaking development. They've created electrostatic materials that function even



with extremely weak ultrasound, heralding the era of permanent implantable electronic devices in biomedicine. Patients with implanted devices need to undergo periodic surgeries for battery replacement. This process carries a significant risk of complications and

imposes both economic and physical burdens on patients. Recent research explores implantable medical devices that operate wirelessly, yet finding a safe energy source and protective materials remains challenging. Presently, titanium (Ti) is used due to its

biocompatibility and durability. However, radio waves cannot pass through this metal, necessitating a separate antenna for wireless power transmission. Consequently, this enlarges the device size, creating more discomfort for patients. The research team addresses this issue by opting for ultrasound, a safety-validated method in various medical fields for diagnoses and treatments, instead of radio waves. They developed an electrostatic material capable of responding to weak ultrasound by utilizing a composite of high dielectric polymers

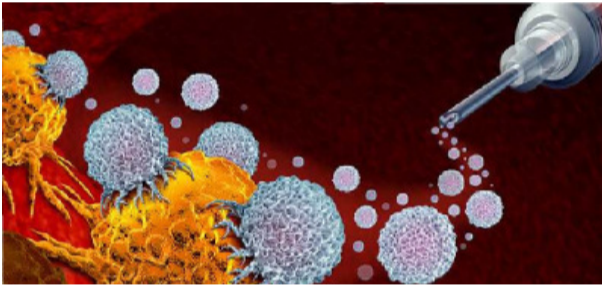
(P(VDF-TrFE)) and a high dielectric constant ceramic material known as calcium copper titanate (CCTO, CaCu3Ti4O12). This material generates static electricity through friction between its material layers, producing effective electrical energy, and possesses an extremely low output impedance, facilitating efficient transmission of the generated electricity. Using this technology, the research team created an implantable neurological stimulator powered by ultrasound-based energy transmission, eliminating the need for batteries. This was confirmed through experimental validation. In animal

model trials, the device was activated even at standard imaging ultrasound levels (500 mW/cm2), imposing minimal strain on the human body. Furthermore, it effectively mitigated symptoms related to abnormal urination caused by overactive bladder disorders through nerve stimulation. Professor Sang-Min Park stated: "We have addressed the challenges in the field of implantable medical devices using ultrasound-based energy transmission technology that is harmless to the human body. This research serves as a case of introducing advanced material technology into

medical devices, and we anticipate that it will promote the emergence of a next-generation medical industry, including the treatment of intractable diseases using implantable devices." Professor Sang-Woo Kim remarked: "Devices manufactured based on highly biocompatible materials exhibit excellent mechanical and chemical stability, making them suitable for treating various diseases requiring long-term therapy. Non-battery, miniaturized components with established long-term stability are expected to bring forth new innovations in the market of human-insertable medical devices."

Cancer immunotherapy without side effect

Researchers at the University of Michigan Health Rogel Cancer Centre have identified a mechanism that causes severe gastrointestinal problems with immune-based cancer treatment. They also found a way to deliver immunotherapy's cancer-killing impact without the unwelcome side effect. "This is a good example of how understanding a mechanism helps you to develop an alternative therapy that's more beneficial. Once we identified the mechanism causing the colitis, we could then develop ways to overcome this problem and prevent colitis while preserving the anti-tumor effect," said senior study author Gabriel Nunez, MD, Paul de Kruif Professor of Pathology at Michigan Medicine. Immunotherapy has emerged as a promising treatment for several types of cancer.



But immune checkpoint inhibitors can also cause severe side effects, including colitis, which is inflammation in the digestive tract. Colitis can cause severe gastrointestinal discomfort, and some patients will discontinue their cancer treatment because of it. The problem facing researchers was that while patients were developing colitis, the laboratory mice were not. So researchers couldn't study what was causing this side effect. To get past this, the Rogel team, led by first author Bernard C. Lo,

Ph.D., created a new mouse model, injecting microbiota from wild-caught mice into the traditional mouse model. In this model, the mice did develop colitis after administration of antibodies used for tumor immunotherapy. Now, researchers could trace back the mechanism to see what was causing this reaction. In fact, colitis developed because of the composition of the gut microbiota, which caused immune T cells to be hyper-activated while regulatory T cells that put the brakes on T cell activation were deleted

in the gut. This was happening within a specific domain of the immune checkpoint antibodies. Researchers then removed that domain, which they found still resulted in a strong anti-tumor response but without inducing colitis. "Previously, there were some data that suggested the presence of certain bacteria correlated with response to therapy. But it was not proven that microbiota were critical to develop colitis. This work for the first time shows that microbiota are essential to develop colitis from immune checkpoint inhibition," Nunez said. To follow up what they saw in mice, researchers reanalyzed previously reported data from studies of human cells from patients treated with immune checkpoint antibodies, which reinforced the role of regulatory T cells in inducing colitis.

Nutrients for Enhanced Immune Health in 2024

Start your new year on a strong note by making a new year resolution to attain better immune health. Good nutrition is critical to support a healthy immune system. There is a strong relationship between poor nutritional status and compromised immunity. By boosting your immunity, you can benefit from better health. Whether you're an adult aiming for optimal health or a parent looking to fortify your child's immunity, incorporating essential nutrients into your daily diet is key. To help you attain better immune health, Dr. Ganesh Kadhe, Director, Medical and Scientific Affairs, Abbott's Nutrition Business lists down important nutrients and their sources that can keep you strong: **Adult Nutrition for Enhanced Immunity** 1. Protein serves as the fundamental building blocks for every cell in the body, contributing to the development of vital components such as muscles, bones, hormones, and antibodies. It plays a crucial role in fortifying the immune system by supporting the production of antibodies and providing essential amino acids as fuel for immune cells. Eggs stand out as an excellent

protein source, yet a diverse range of foods, including chickpeas, cottage cheese, quinoa, Greek yogurt, peanuts, and almonds, also function as significant contributors to protein intake. 2. Vitamin A helps regulate the immune system. Known as the "anti-infective vitamin," this nutrient keeps your skin, mouth, stomach, and lungs healthy so that they can fight infection. It's also key for sharp vision. Consume it with some fat for better absorption. Sweet potato, pumpkin, carrots, and spinach are loaded with Vitamin A. 3. Vitamin C helps the body build healthy skin and connective tissue, which blocks the entry of foreign microbes. Vitamin C also acts as an antioxidant protecting cells from damage. It also helps protect against anemia by helping us absorb more iron from plant foods. Oranges are best known as sources of Vitamin C. However, apart from that, certain foods power-packed with Vitamin C are kiwis, strawberries, broccoli, tomatoes, cauliflower, and red peppers. 4. Vitamin E works as an antioxidant, protecting cell membranes from damage due to free radicals. Healthy cell

membranes help keep foreign microbes out and support a healthy immune response. Vitamin E is a common nutrient found in most foods. Cooking oils, seeds, and nuts are exceptionally rich sources. 5. Vitamin D is a multitasking nutrient that helps to activate immune cells and regulate their function. Vitamin D helps our bodies absorb calcium and promotes a strong immune system. There are few foods that are naturally rich in vitamin D3, such as fish liver oils, egg yolks, orange juice and cheese. 6. Zinc is needed for cellular reproduction, which is important in the synthesis of new immune system cells. Zinc is also critical for proper growth and development, especially during childhood and adolescence. Meat, especially the red meat is an excellent source of zinc for those who prefer non vegetarian food. For vegetarians, food like chickpeas, lentils and beans contain substantial quantity of zinc. Seeds could also be a healthy addition to your diet. **Child Nutrition for Strong Immunity** 1. Protein-Packed Meals: Children, in their developmental years,

benefit from protein-rich foods for growth and a resilient immune system. Include sources like lean meats, dairy products, eggs, legumes, and nuts in their diet 2. Colorful Fruits and Vegetables: Introduce a variety of fruits and vegetables to provide essential vitamins and minerals. Brightly colored produce such as berries, carrots, and leafy greens are not only visually appealing but also rich in nutrients 3. Calcium and Vitamin D for Growth: For better bone health and overall growth ensure sufficient intake of calcium and Vitamin D. Include dairy products, fortified cereals, and kid-friendly Vitamin D-rich foods 4. Fiber for Gut Health: Ensure a balanced diet with fiber-rich foods like whole grains, fruits, and vegetables. A healthy gut contributes to a robust immune system Prioritizing nutrient rich diet can go a long way in strengthening the immune system, thereby crafting a roadmap to vitality and long-term resilience. Here's to a year of nourishing our bodies, cultivating strength, and unlocking the limitless potential that comes with taking charge of our well-being.

Antibiotic over use rings alarm bells

Antibiotic resistance is one of the world's most urgent health problems and overuse and misuse of antibiotics are major factors in antibiotic resistance, says Dr Satyavan Saurabh. The general public, healthcare providers, and hospitals can all help ensure that medications are used correctly. This may reduce the growth of antibiotic resistance. Overuse of antibiotics - especially when they are not the right treatment - promotes antibiotic resistance. According to the Centers for Disease Control and Prevention, about one-third of antibiotic use in people is neither necessary nor appropriate. Healthcare professionals and especially pharmacists play/can play an important role in drug abuse and drug safety. Appropriate and effective patient education and counseling by pharmacists is key to achieving desired outcomes for treating patients, including clinical, economic, and humanitarian outcomes.

Dr Satyavan Saurabh in a article says: Antibiotics are important medicines. Many antibiotics can successfully treat infections caused by bacteria (bacterial infections). Antibiotics can stop the disease from spreading. Antibiotics can reduce serious disease complications. However, some antibiotics that used to be typical treatments for bacterial infections no longer work as well. And some drugs don't work at all against some bacteria. When an antibiotic no longer works against certain strains of bacteria, those bacteria are said to be antibiotic-resistant. Antibiotic resistance is one of the world's most urgent health problems. Taking antibiotics for colds and other viral illnesses doesn't work - and it can create bacteria that are harder to kill. Taking antibiotics too often or for the wrong reasons can cause bacteria to change so much that antibiotics no longer work against them. This is called bacterial resistance

or antibiotic resistance. But if a person is using antibiotics repeatedly, then the bacteria develop immunity against that medicine. After this, it becomes very difficult to fix it. This is called antimicrobial resistance. In such a situation, treatment is not done properly but toxins start accumulating in the liver. A recent survey by the National Centers for Disease Control found that more than half of the nearly 10,000 hospital patients surveyed for the study were given antibiotics to prevent rather than treat infections. This is a worrying sign as India has one of the highest burdens of drug-resistant pathogens worldwide, leading to the high incidence of antimicrobial resistance (AMR). Overuse of antibiotics - especially when they are not the right treatment - promotes antibiotic resistance. According to the Centers for Disease Control and Prevention, about one-third of antibiotic use in people

is antibiotic resistance. appropriate. He also calls for a strong regulatory framework to monitor and enforce compliance with antibiotic prescription guidelines. It includes mechanisms to punish non-compliance and encourage compliance. Regular monitoring of antibiotic resistance patterns is important. The effectiveness of guidelines can be assessed by the ability to track changes in resistance patterns over time and take corrective action. Restricting access to reserve antibiotics is important to reduce resistance. Overuse and misuse of antibiotics are major factors in antibiotic resistance. The general public, healthcare providers, and hospitals can all help ensure that medications are used correctly. This may reduce the growth of antibiotic resistance. Healthcare professionals and especially pharmacists play/can play an important role in drug abuse and drug safety.

Novel approach for lymph node metastasis treatment

Researchers at Tohoku University have discovered a new approach for treating lymph node metastasis. Anticancer drugs are administered directly into the LNs under ultrasound guidance (Lymphatic Drug Delivery System or LDDS) to target sentinel lymph nodes (LNs) and generate antitumor effects locally, preventing distant metastasis. This approach not only improves the anticancer effect but also reduces the nasty side effects commonly associated with systemic chemotherapy. Professor Tetsuya Kodama from Tohoku University's Graduate School of Engineering led the research team. Recent research has highlighted sentinel LNs as the gateway for metastasis. They are the initial lymph nodes that receive drainage from a primary tumor and indicate that metastasis has begun or could potentially occur. Thus, there is a need for improved control of LN metastasis without surgical or radiation interventions. Still, the occurrence of side effects can differ from individual to individual and from one treatment to another.

In fact, two individuals undergoing the same treatment may encounter markedly different experiences. Most commonly, some individuals experience uncomfortable side effects that gradually diminish over time. In a prior investigation, some of the current researchers utilized LDDS incorporating heightened osmotic pressure and viscosity of docetaxel, yielding promising outcomes in the treatment of early-stage LN metastasis during preclinical research. Based on this, they hypothesized that administering docetaxel -- a widely used clinical anticancer drug -- through LDDS at an osmotic pressure and viscosity of 1,960 kPa and 12 mPa·s would result in superior antitumor effects, prolonged survival, and minimal adverse reactions. To test this hypothesis, Kodama and his team administered the treatment to a preclinical model of a metastatic lymph node mouse model. Their findings confirmed superior therapeutic outcomes, increased complete response, improved survival, and reduced adverse complications.

KOTAK MAHINDRA BANK LIMITED ONLINE E-AUCTION SALE OF ASSET. E-auction sale notice for sale of immovable assets under the securitization and reconstruction of financial assets and enforcement of security interest act, 2002 under rule 8(5) read with proviso to rule 8(6) of the security interest (enforcement) rule, 2002.

PHOENIX ARC PRIVATE LIMITED ONLINE E-AUCTION SALE OF ASSET. E-auction sale notice for sale of immovable assets under the securitization and reconstruction of financial assets and enforcement of security interest act, 2002 under rule 8(5) read with proviso to rule 8(6) of the security interest (enforcement) rule, 2002.