NOVEMBER 2024 | THE PREMED SCENE'S MONTHLY MEDICAL NEWSLETTER

CROSSROADS

THE OFFICIAL NEWSLETTER OF THE PREMED SCENE

RISING STARS IN MEDICINE: Dr. Arianna Yanes

Dear medical newsletter readers,

We wish all of you a happy November! This month, we bring you the most updated news in the field of medical research. November is Men's Health Awareness Month. Siri Nikku is this month's Rising Stars in Medicine writer, talking more about Dr. Arianna Yanes and her work in the field of dermatology. Next, Ashby Glover talks about advancements regarding COVID-19 research. Finally, Siri Nikku ends by sharing more about antimicrobial resistance.

Please enjoy reading The Premed Scene's November 2024 Medical Newsletter!

Ilana Saidov

SEE WHAT ELSE IS INSIDE:

Men's Health Awareness Month

By: Ilana Saidov

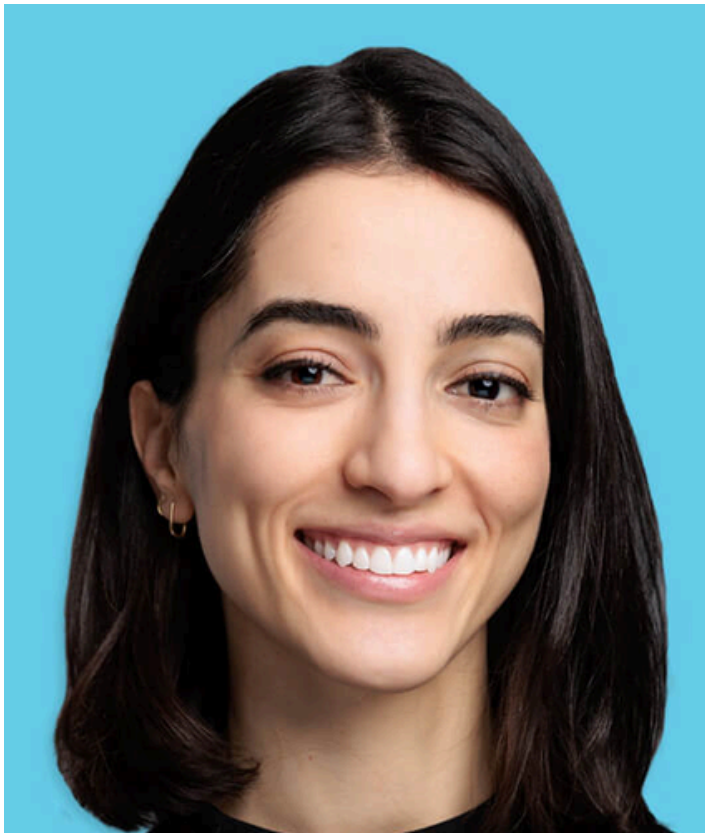
Prostate cancer remains one of the most prevalent types of cancer affecting men around the world. As scientific understanding and treatment strategies evolve, research from the Medical University of Vienna has revealed a promising new approach that could transform prostate cancer treatment. Specifically, the researchers focused on developing a method that not only slows tumor growth but also strengthens the body's immune system to fight tumor-causing cells.

Through studying the GP130 signaling pathway in prostate cells, the research team discovered that activating this pathway can slow down the growth of tumor cells. Lukas Kenner, the lead researcher from the Clinical Department of Pathology, highlighted the significance of these findings. He stated, "Our research provides exciting new evidence that the activation of GP130 in prostate cells not only slows tumor growth but also stimulates the immune system to actively fight cancer cells." The ability to reduce tumor growth while enhancing immune response offers an innovative approach that could transform how physicians treat prostate cancer. Thus, by activating the GP130 pathway, there is the potential to manage the disease effectively and improve the overall quality of life of patients.

Source:
Medical University of Vienna. "New option for treating prostate cancer." ScienceDaily. ScienceDaily,8November2024<www.sciencedaily.com/releases/2024/11/241108113714.htm>.

Rising Stars in Medicine: Dr. Arianna Yanes

By: Siri Nikku



Dr. Arianna Yanes is a board-certified dermatologist and fellowship-trained Mohs surgeon concentrating on skin cancer surgery and treatment. Dr. Yanes pursued and earned her B.S. and M.D. degrees from Northwestern University's Honors Program in Medical Education, a dual undergraduate and medical school program. In addition to being accepted into a competitive program, she graduated summa cum laude from medical school and was inducted into the Alpha Omega Alpha Honor Medical Society. After completing her medical degree, Dr. Yanes completed her residency at the University of Pennsylvania, where she gained comprehensive training in treating and managing skin conditions for patients of all ages and backgrounds.

To advance her training, Dr. Yanes completed a fellowship in Mohs micrographic surgery and dermatologic oncology. While at Massachusetts General Hospital, she received advanced training in skin cancer and pathology, facial reconstruction, cosmetic dermatology, and oncological management of complex skin cancers. Utilizing her experience, Dr. Yanes provides high-quality and compassionate care to all her patients on a case-by-case basis. Along with her extensive medical education, Dr. Yanes has delivered presentations at national conferences and authored articles in well-known peer-reviewed journals, including the New England Journal of Medicine, JAMA Dermatology, the Journal of the American Academy of Dermatology, and Dermatologic Surgery. Her current services include general dermatology, such as Accutane, eczema, and dermatitis; skin cancer, such as cryotherapy and annual skin examinations; and cosmetic dermatology, such as botox and laser hair removal.

Source: https://www.usdermatologypartners.com/provider/arianna-yanes-md/

DNA "Hands" Capture and Inhibit Covid-19 Virus

By: Ashby Glover

DNA is a powerful tool. The precision and flexibility of its programming, its helpful mechanical properties, and reliable structural format make it a prime material for biological construction. Biomedical engineers can use DNA's unique properties to create DNA nanostructures. These structures are built with specific functionality in mind.

The DNA NanoGripper was designed and synthesized to resemble a hand with a palm and four finger-like structures that can bend. The fingers can be given different functions depending on the researcher's goals. For this DNA NanoGripper, the fingers were fitted with ssDNA (single-stranded DNA) to recognize and bind to SARS-COV-2 (COVID-19).

Dubbed "DNA origami," the nanoscale folding of DNA to create two- and three-dimensional shapes was proposed in the early 1980s and has since been applied to many purposes, such as drug delivery. DNA's well-understood structure, especially the specific interactions between its complementary base pairs, make it valuable and easy to manipulate for different uses.

The design of the NanoGripper was inspired by human hands, bird claws, and bacteriophages. Each finger has three phalanges with three rotatable joints. These joints can bend when binding to the desired particle or molecule, capturing them. When designed to bind to the COVID-19 virus, the NanoGripper could selectively detect intact SARS-CoV-2 virions in human saliva at a sensitivity equal to that of the qPCR tests used by hospitals.

In addition to detecting the presence of the virus, the NanoGripper was also able to block the entry of the virus into host cells, potentially inhibiting the infection rate. Dr. Xing Wang, who led the project, expressed that the NanoGripper could be used as a preventative therapeutic, perhaps as a nasal spray that would prevent inhaled viruses from interacting with cells in the nose. As an easily modifiable structure, the NanoGripper could also be engineered to identify other viruses or to carry treatments directly to certain target cells. The flexibility and innovation of the NanoGripper demonstrates the incredible biomedical potential of DNA origami.

Lifeng Zhou, et al. "Bioinspired designer DNA NanoGripper for virus sensing and potential inhibition." *Sci. Robot* 9, no. 96 (2024). doi:10.1126/scirobotics.adi2084

Liz Ahlberg Touchstone. "Nanorobot hand made of DNA grabs viruses for diagnostics and blocks cell entry." University of Illinois at Urbana-Champaign, News Bureau. November 27, 2024. https://news.illinois.edu/view/6367/1787912283

Antimicrobial Resistance

By: Siri Nikku

Antimicrobial Resistance (AR) is a growing global health concern, taking the lives of about 1.27 million people worldwide and is associated with approximately 5 million deaths in 2019. In the United States, there are 2.8 million antimicrobial infections annually, and according to the CDC, more than 35,000 people die as a result. AR occurs when bacteria and fungi resist the drugs prescribed to kill them, resulting in these germs thriving in the host's body. It is even more complicated and sometimes even impossible to treat the infection once there is resistance.

Many factors can cause AR, such as the spread of germs, their resistance mechanisms, and the general use of antimicrobial drugs. Antibiotic and antifungal medications kill both helpful germs and the germs causing infection; however, this can lead to our bodies becoming weaker with our current line of defense being killed. Antimicrobial resistance increases when these antibiotics and antifungals put tension on bacteria and fungi to survive. Antimicrobial-resistant germs often survive. Surviving microbes usually have resistance in their genes, dividing and passing on the traits to future generations. Even more surprisingly, antimicrobial-resistant germs can share their resistant genes with germs without prior exposure to antibiotics or antifungals, leading to a newer and more resistant infection.

Antimicrobial resistance can affect anyone at any point in their life, so some ways to prevent it include maintaining healthy habits, not contracting infections in the first place, and ensuring that your symptoms are from a bacteria or a fungus rather than a virus. Antibiotics and antifungals being used instead can lead to more damage and side effects than help.

Source: https://www.cdc.gov/antimicrobial-resistance/about/index.html