January 2025 | The Premed Scene's Monthly Medical Newsletter

CROSSROADS

The Official Newsletter of The Premed Scene

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Dear medical newsletter readers,

Wishing you all a joyful holiday season! This month, we bring you the most updated news in the field of medical research. December was HIV/AIDS Awareness Month. I am this month's Rising Stars in Medicine writer, talking more about Dr. Sandra Lee and her work in the field of dermatology. Next, Siri Nikku talks about advancements in antiretroviral therapy medicines. Finally, Ashby ends by sharing more about how HIV research contributed to the development of the COVID-19 vaccine.

Please enjoy reading The Premed Scene's January 2025 Medical Newsletter!

Ilana Saidov

HIV/AIDS Awareness Month

By: Ilana Saidov

HIV is a single-stranded RNA virus that is transmitted through the direct exchange of bodily fluids such as blood, breast milk, and semen. The virus infects cells with the CD4 glycoprotein receptor. These cells include CD4 T cells, macrophages, and dendritic cells. Aside from CD4, HIV binds through the viral gp 120 glycoprotein to chemokine receptors (CCR5 and CXCR4) on the surface of macrophages and T cells. If the virus infects CD4 T cells, there is a rapid decline in CD4 T cells and progression to AIDS. This virus is difficult to control since it escapes immune responses and develops resistance to antiviral drugs through rapid mutations.

In a recent study from NYU Langone Health, researchers discovered that kidney transplants from HIV-positive donors to HIV-positive recipients are not only safe but also practical. Dr. Dorry Segev, a transplant surgeon and senior investigator at NYU Grossman School of Medicine, was the first to perform an HIV-to-HIV kidney transplant surgery. His research on kidney transplants showed that "for kidney transplants performed using organs from 99 donors with HIV and 99 without HIV, one-year survival rates for HIV-positive recipients were the same." In addition, three-year survival rates and organ rejection rates were similar between the two groups of recipients. Thus, the study provides strong evidence that kidney transplantation among those with HIV is a viable and effective treatment option. This advancement enhances the quality of life for HIV-positive patients and contributes to the broader goal of increasing organ availability in the transplant community. In the future, Dr. Segev plans on conducting more research on transplanting additional organs, such as the heart and lungs, to test their effectiveness.

Source:

NYU Langone Health / NYU Grossman School of Medicine. "Kidney transplantation among those with HIV infections shown safe and effective, study suggests." ScienceDaily. ScienceDaily,17October2024. <www.sciencedaily.com/releases/2024/10/241017113517.htm>.

Rising Stars in Medicine: Dr. Sandra Lee

By: Ilana Saidov

Dr. Sandra Lee, widely known as "Dr. Pimple Popper," is a renowned board-certified dermatologist, television personality, and social media influencer. Since starting her journey as a cosmetic dermatologist, her primary goal has been to help people feel confident in their appearance.

Through her engaging educational content on social media and television series, Dr. Lee has significantly transformed the field of dermatology. As "Dr. Pimple Popper," she has entertained and informed millions about skin health. Her series offers viewers an inside look into the world of dermatology, showcasing her daily clinic activities. Moreover, it provides comfort to those struggling with various skin conditions while teaching audiences how to care for their bodies and skin properly.

Dr. Lee uses social media to connect with her audience, educating them about skin health and dermatological issues. Her Instagram account, filled with before-and-after photos and informative posts, has attracted millions of followers. By demystifying dermatological procedures and promoting skin health awareness, she has made a significant impact on public perceptions of skincare.

Through her contributions to dermatology and her ability to connect with people, Dr. Lee is sure to inspire future generations to prioritize skin health and overall well-being.

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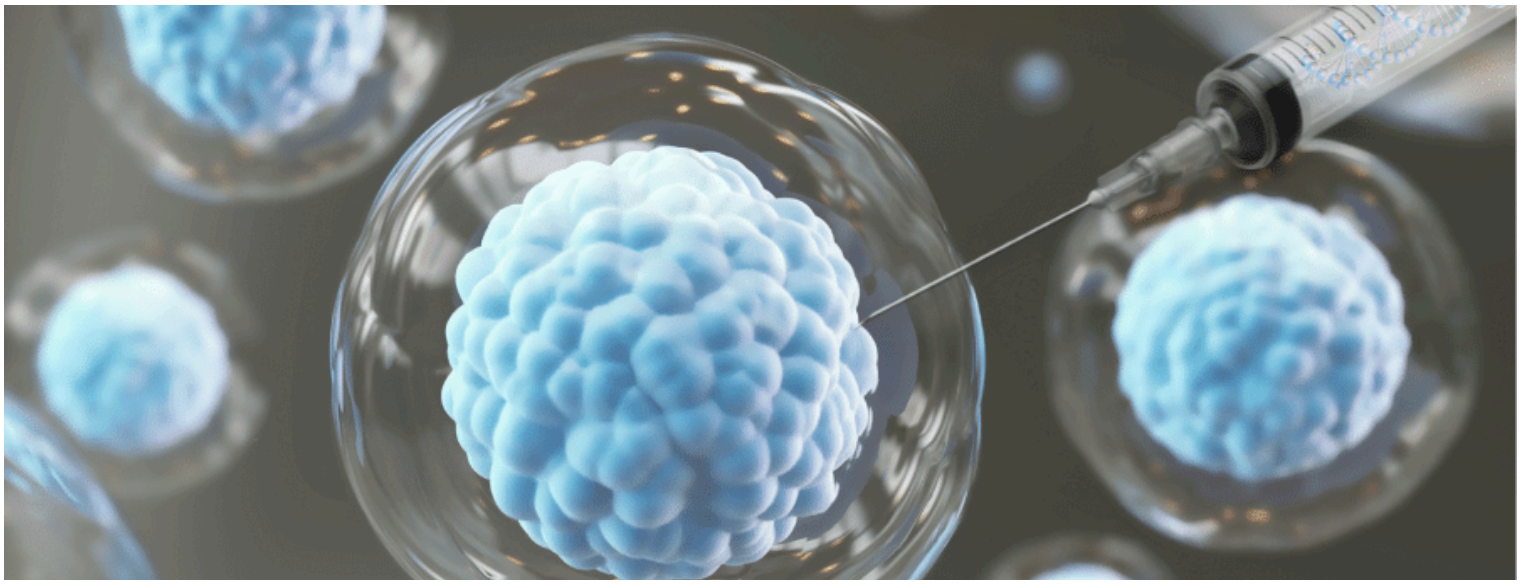

HIV/AIDS Treatment: ART to Gene Therapy

By: Siri Nikku

While HIV/AIDS has no treatment, there are still several medications that physicians prescribe to reduce the chance of spreading to others and prevent further complications. Everyone diagnosed with HIV is recommended to be on antiretroviral therapy medicines (ART), regardless of their stage or symptoms. A class of anti-HIV medicine is broken down into several categories: Non-nucleoside reverse transcriptase inhibitors (NNRTIs), Nucleoside or nucleotide reverse transcriptase inhibitors (NRTIs), Protease inhibitors (PIs), Integrase inhibitors, and Entry or fusion inhibitors. It is recommended to take two medicines from one class and a third medicine from a different class. ART itself is a combination of two or more medicines from various classes. Taking ART is the best way to reduce and maintain HIV viral load to an undetectable level, decreasing its chance of spreading.
With all of this research, there is still a need for new types of HIV/AIDS treatment due to the side effects of ART, such as penetration of ART into the Central Nervous System (CNS). Additionally, ART is not as accessible in lesser developed regions of the world. Gene therapy is a newer investigation that involves editing patients' immune cells to better identify and destroy HIV-positive cells. Another approach is zinc finger nucleases (ZFNs) and transcription activator-like effector nucleases (TALENs), cleaving off sequences of the HIV genome, creating double-stranded breaks to prevent the production of viral particles. Lentiviral vector-mediated gene therapy is another type of gene therapy that works by inserting safety genes into vectors, targeting immune cells in the process. A shift in strengthening the immune system rather than eliminating the virus itself has led to the rise of new therapy options being researched to universalize treatment for everyone everywhere.

<u>Sources:</u>

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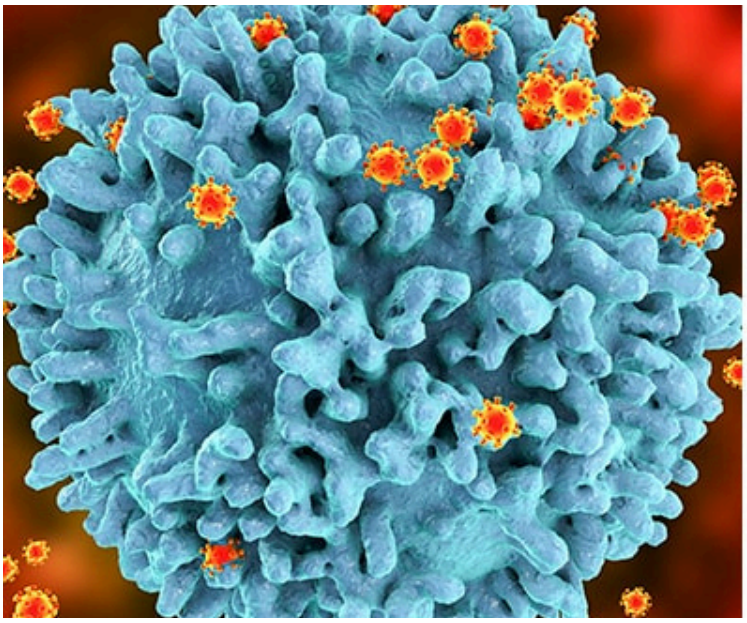

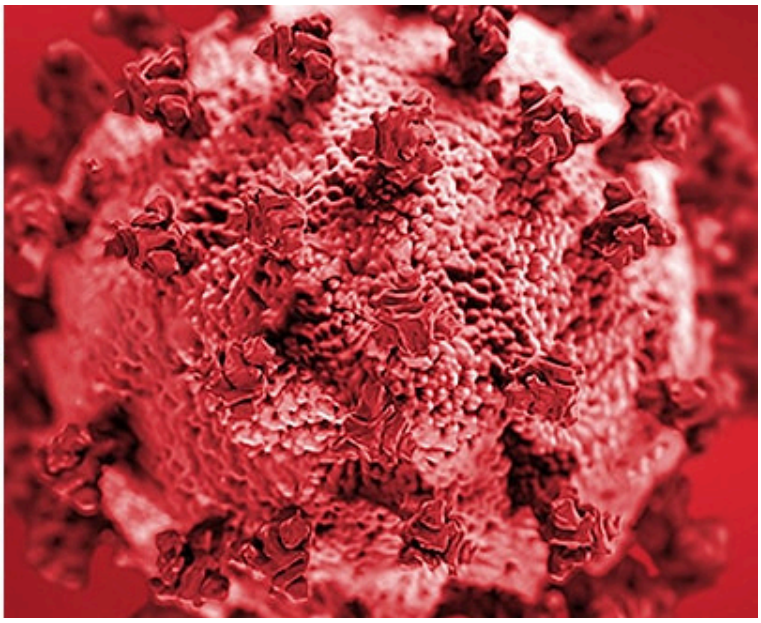

Decades of HIV Research Accelerated COVID-19 Vaccine Development

By: Ashby Glover

When researchers began to develop the COVID-19 vaccine, they were able to use the hard-earned knowledge accumulated by HIV research as a road map. Both HIV and COVID-19 are retroviruses. Decades of research on HIV have allowed scientists to develop the necessary tools to closely study the structure of retroviruses and their behavior inside of hosts.

HIV first appeared in the early 1980s. Although retroviruses had been documented before, HIV provided the catalyst for intense research into its mechanisms. Notably, the enzyme essential for viral replication, reverse transcriptase, was sequenced, allowing the first antiretroviral drug AZT to be created in 1987. HIV also catalyzed the understanding of immune system function, leading to the discovery of how the immune system recognizes, engages, and targets virally infected cells.

"If it wasn't for the decades of HIV research, we would not have had the COVID-19 vaccines so rapidly."
-Dan Barouch, director of the Center of Virology and Vaccine Research at Beth Israel Deaconess Medical Center

Years of HIV research also constructed the infrastructure necessary to respond quickly to the COVID crisis. The development of animal models has allowed researchers to study host responses to vaccines and treatments. In addition, the foundation of modern-day clinical trials was developed during the HIV response.

The historically quick development of the COVID-19 vaccine saved countless lives. That rapid response was only possible due to the groundwork of decades of HIV research.

Sources:
"40 Years of HIV Discovery: The Virus Responsible for AIDS is Identified on May 20, 1983." Institut Pasteur, 15 May 2023.

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