

The Brown Journal of Healthcare & Advancements

Volume 3 | Issue 1



Editor's Note

"For he who has health has hope; and he who has hope, has everything." -Thomas Carlyle

The challenges facing the world, especially the medical world, can at times seem insurmountable. We face global pandemics, rising costs, and billions of people with inadequate access to and quality of care. Despite this apparent bleak outlook, the cornerstone of healthcare, as Carlyle states, is hope. However, hope is not just a concept reserved for those on the receiving end of healthcare but is needed from the inventors of medical devices to the researchers in labs to the doctors on the frontlines to the families of the patients. The Brown Journal of Healthcare Advancement aspires to bring you a piece of that hope. In this issue, we explore the hope brought by healthcare in dimensions ranging from rural Bangladesh to

the lab bench at Brown University. The Journal is proud to feature the less publicized innovations of the healthcare space. Through personal interviews with many founders and leaders of every organization we write about, our teams get a glimpse into the inner workings of the industry. Our creative team brings to life the stories we tell in original and unique artwork for each article. We'd like to thank everyone who contributed their time, knowledge, and skills to the Journal.

That brings us to the most important part of the Journal's lifecycle: you, the reader. Your interest and passion for the topics we cover give us purpose. Just like the themes and people we write about, we appreciate the diversity of our readers. Whether you are a university student, healthcare professional, or just a curious mind, we trust that this edition of the Journal will be an illuminating read. May the manifes-

tations of hope presented here be your inspiration to seek out hope wherever you can find it and to create it where there is none.

Thank you for reading.

Sincerely,
Atticus Henry

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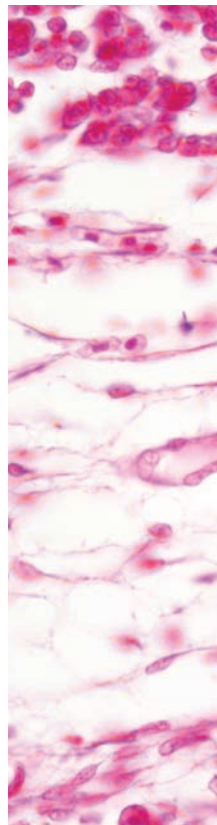
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Creative Director's Note

This issue examines the invisible in our daily fabric of life. The creative team examined 12 specimens from the cerebral cortex to the lymph node viewed under the microscope at the Nature Lab. The Nature Lab, reminiscent of a Cabinet of Natural Curiosities, houses the Edna Lawrence Natural History Collection, dating back to 1937.

The journal's graphic design was led by Kira Karafotas, who eagerly collaborated with the Nature Lab to visually capture the work of the writing team at a microscopic level. In this journal, we work to visualize themes written about RNA-based therapies, reproductive health, AI in healthcare, biotechnology, and maternal health.

The book you hold is formatted like a field notes journal. It's meant to feel like you can keep it



in your pocket—and pull it out at a moment's notice. It represents the accumulation of your scientific observations intertangled with the threads of your daily life. Perception is an act we often take for granted. Our minds tend to jump to conclusions, rushing to ask: What's next? What does this mean? The ability to pry, poke, step back, and observe without immediate judgment is a skill we naturally possess but must re-train as designers, researchers, writers, and editors. This journal represents that very process of observation. As the Creative Director, I hope you feel the essence of scientific discovery unfold as you turn these pages.

Creative Director, Christina Wang
Lead Graphic Designer, Kira Karafotas

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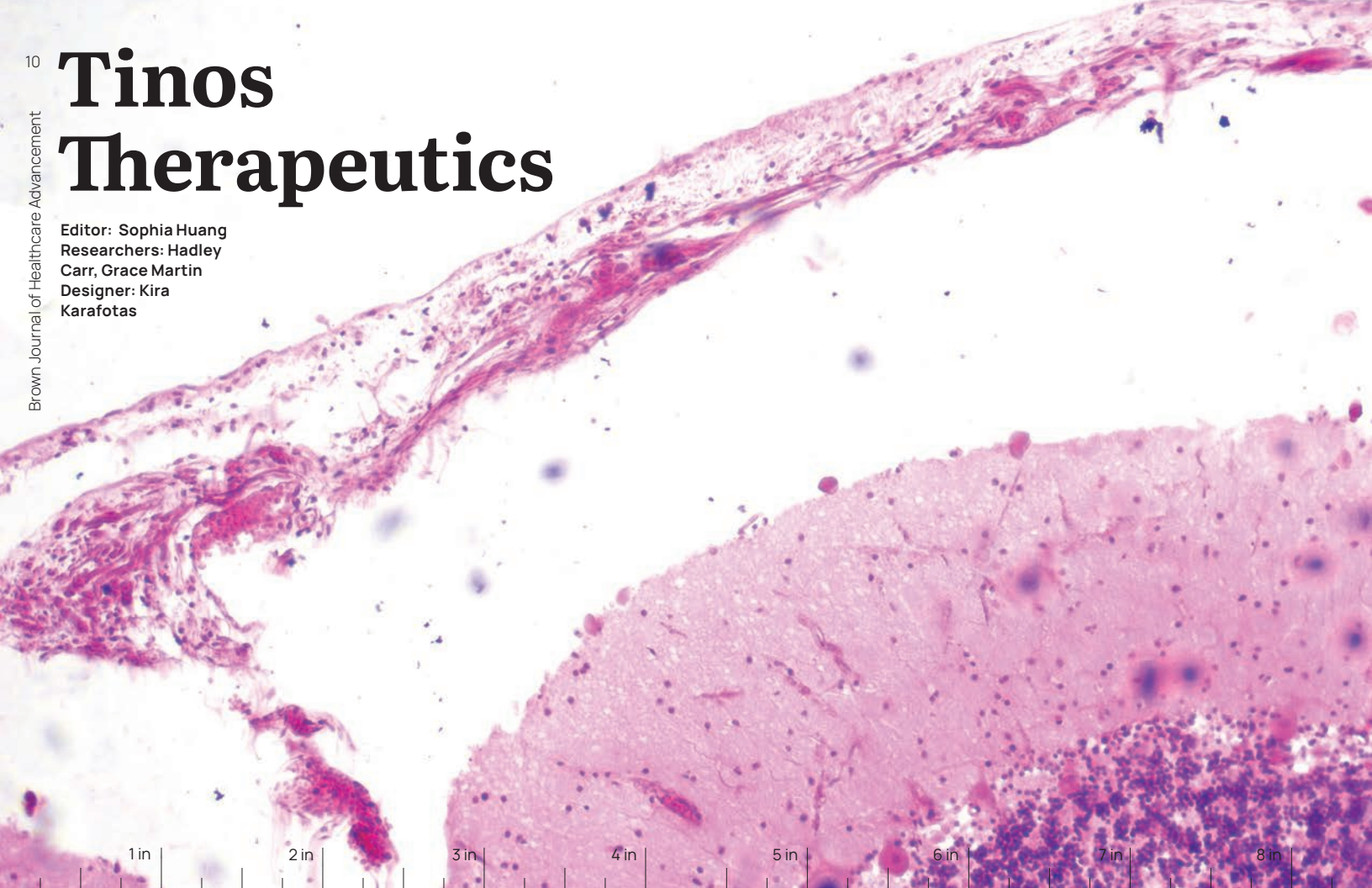
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Tinos Therapeutics

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Pioneering RNA-Based Cancer Therapies



🔍 : microscopic image of a human brain tissue

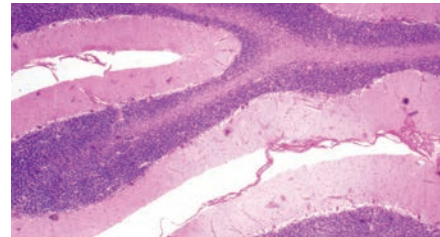
As the world grappled with a global health crisis in December 2020, a groundbreaking development emerged in messenger RNA (mRNA)-based vaccines.¹ By instructing host cells to produce the SARS-CoV-2 spike protein, mRNA vaccines triggered a targeted immune response without causing disease.² These were the first mRNA vaccines approved for human use.³ The rapid development and scalability of these vaccines marked a milestone for RNA-based therapeutics.

1. Katella, Kathy. "Comparing the COVID-19 Vaccines: How Are They Different?" Yale Medicine, September 3, 2024.

2. Genome.gov. "Understanding COVID-19 mRNA Vaccines,"

3. NIAID: National Institute of Allergy and Infectious Diseases. "Decades in the Making: mRNA COVID-19 Vaccines," April 4, 2024.

While mRNA was discovered in 1961, it wasn't until 30 years later that we began to see breakthroughs in RNA-based therapy research.³ These therapies can target specific genetic components within the cell that other drugs cannot, thus evolving as a powerful platform for the treatment of various diseases.⁴ Among these diseases is glioblastoma, an aggressive type of brain cancer.⁵ Tinos Therapeutics, a company founded by Brown professor Dr. Nikos Tapinos and biotech executive Wendy Parrow, hopes to target glioblastoma with their development of a RNA-based therapeutic that has shown promise as a treatment.



4. Kim, Young-Kook. "RNA Therapy: Rich History, Various Applications and Unlimited Future Prospects." *Experimental & Molecular Medicine* 54, no. 4 (April 19, 2022): 455-65.

5. Hanif et al., "Glioblastoma Multiforme: A Review of Its Epidemiology and Pathogenesis Through Clinical Presentation and Treatment." *PubMed* 18, no. 1 (January 1, 2017): 3-9.

Since arriving at Brown in 2016, Tapinos has investigated RNA modifications in cancer stem cells at his lab, the Tapinos Laboratory of Cancer Epigenetics and Plasticity.⁶ Through his research on stem cells using patient-derived tumors, Tapinos found that RNA modifications played a crucial role in regulating protein production as the intermediate between DNA and protein production. By altering the modification pattern of protein transcription, he discovered that cancer cells could be tricked into degrading proteins that contribute to tumor growth instead of producing them.

Tapinos' research focuses on targeting RNA demethylase, an enzyme that can remove methyl groups from RNA.⁷ When demethylation is inhibited, it can trigger the degradation of tumor-causing mRNA.⁸ RNA demethylase is highly expressed in tumor cells,



7. Shen, Dandan, Bo Wang, Ya Gao, Lijuan Zhao, Yaping Bi, Jing Zhang, Ning Wang, et al. "Detailed Resume of RNA m6A Demethylases." *Acta Pharmaceutica Sinica B* 12, no. 5 (May 1, 2022): 2193-2205

8. John P. Zepecki et al., "miRNA-mediated Loss of m6A Increases Nascent Translation in Glioblastoma," *PLoS Genetics* 17, no. 3 (March 8, 2021): e1009086,

rendering it an attractive therapeutic target.⁹ Using the ZINC database, a library containing billions of compounds, and an artificial intelligence algorithm, the 3D structure of RNA demethylase was analyzed and 60,000 candidate inhibitor compounds were discovered.¹⁰ However, this list needed to be narrowed down. Tapinos investigated the potential of the compounds to become drugs by testing their permeability through the blood-brain barrier in silico, a critical consideration for treating brain tumors. After settling on 30 possible compounds, each one was synthesized and the end result was the development of a drug that blocked demethylase activity with nanomolar potency. Initial testing on patient-derived glioma cells from brain tumors showed that their drug effectively reduced tumor growth in vitro and in vivo. Further testing revealed promising

9. Shen et al., "The RNA Demethylase ALKBH5 Promotes the Progression and Angiogenesis of Lung Cancer by Regulating the Stability of the LncRNA PVT1," *Cancer Cell International* 22, no. 1 (November 15, 2022)

10. Gentile et al., "Artificial Intelligence-enabled Virtual Screening of Ultra-large Chemical Libraries With Deep Docking," *Nature Protocols* 17, no. 3 (February 4, 2022): 672-97,

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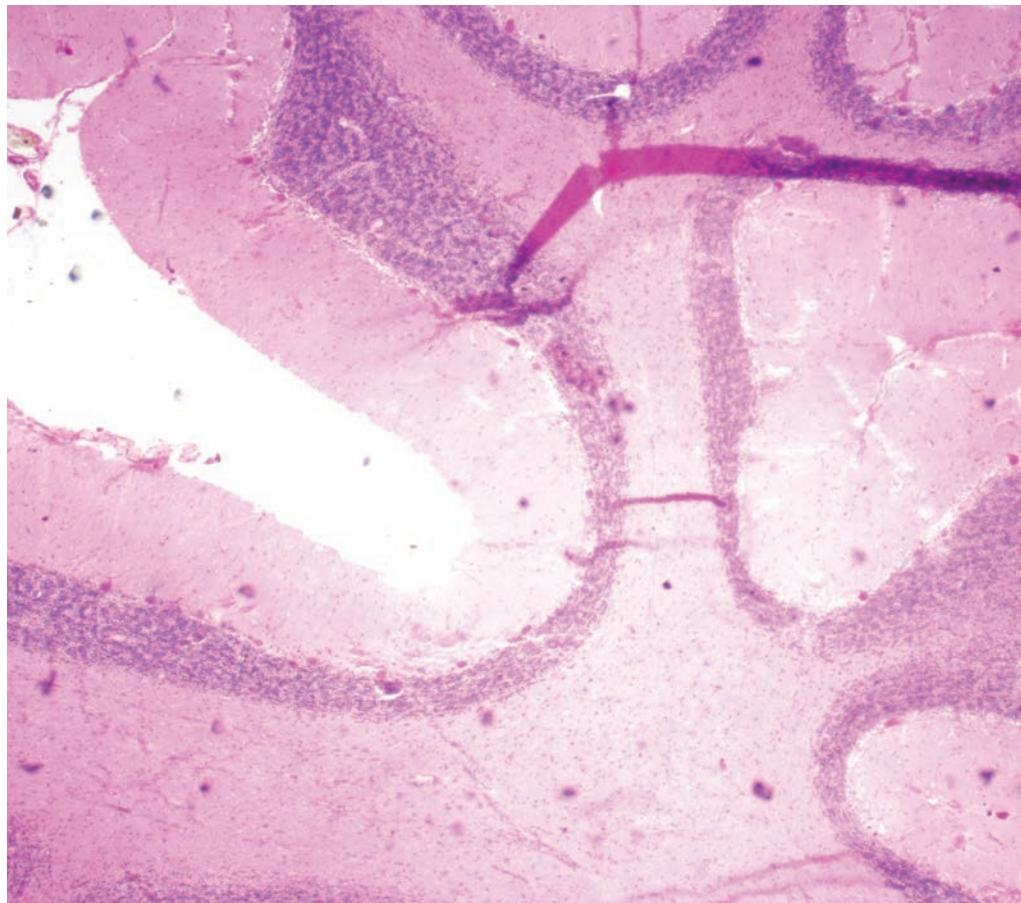
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results for their drug's efficacy in mitigating colon, pancreatic, ovarian, lung, and pediatric brain cancers. These findings suggest this novel therapeutic approach could have broad applications across various solid tumors.

Recognizing the potential of their findings, Tapinos transitioned the research from his academic lab to a company, Tinos Therapeutics, in July 2023. Currently, Tinos Therapeutics is securing funding to advance their research and begin the manufacturing process to create and refine their drug. They aim to start phase 1 clinical trials by 2026, which will establish their drug's safety and dose range. In five years, they hope to launch their drug and eventually deliver it to the market. Due to the promising preclinical evidence, there is potential for the FDA to grant them a breakthrough therapy designation, expediting the drug's



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development and review period by two to three years, allowing for earlier availability.¹¹

Another exciting project at Tinos Therapeutics is the creation of a siRNA-based cancer therapeutic that targets chromatin within cancer cells in order to stop their replication. A type of RNA interference technology known as siRNA activates RISC (RNA-induced silencing complex), which degrades the sense strand of the siRNA and keeps the antisense strand bound to RISC.¹² The antisense strand leads RISC to a complementary mRNA target to be degraded.¹² With this mechanism, siRNA can inhibit specific gene expression through in vivo insertion. Tinos leverages this property of siRNA to target the expression of chromatin, effectively “closing down” chromatin in cancer cells in order to stop their division and proliferation.¹³

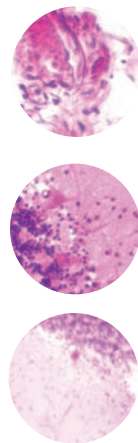
11. Wills, Todd. “Breakthrough Therapy Designation: The Real-world Impact of Structural Novelty.” CAS, September 23, 2022.

12. Lam et al., “siRNA Versus miRNA as Therapeutics for Gene Silencing,” *Molecular Therapy – Nucleic Acids* 4 (January 1, 2015): e252,

13. Martinez-Moreno et al., “Role of theEGR2promoter Antisense RNA in Modulating Chromatin Accessibility and Spatial Genome Organization.” *bioRxiv* (Cold Spring Harbor Laboratory), May 2, 2022

During an extensive literature review, Tapinos identified approximately 280 epigenetic modifiers involved in brain tumors. In order to pinpoint the most promising target, Tapinos collaborated with a lab in Singapore to clone all 280 epigenetic genes. They then performed in vivo and in vitro screenings, overexpressing the proteins and assessing their impact on cancer growth. The screenings revealed that histone deacetylase was the number one target and a sub-pattern for histone H3.3, playing a role in inducing heterochromatin production – a dense form of chromatin that blocks transcription of cancer cells.¹⁴ Through the use of siRNA therapeutics, these histone acetylase targets can be silenced. Preliminary data shows that after heterochromatin formation, the silenced state is inherited by daughter cells following DNA replication, stopping the ability to divide and spread for generations. These

14. Hassan et al., “Heterochromatin Spreading in Cancer Cells Through HDAC7 Mediated Histone H3.3 Landscape Reprogramming,” *bioRxiv* (Cold Spring Harbor Laboratory), March 14, 2024



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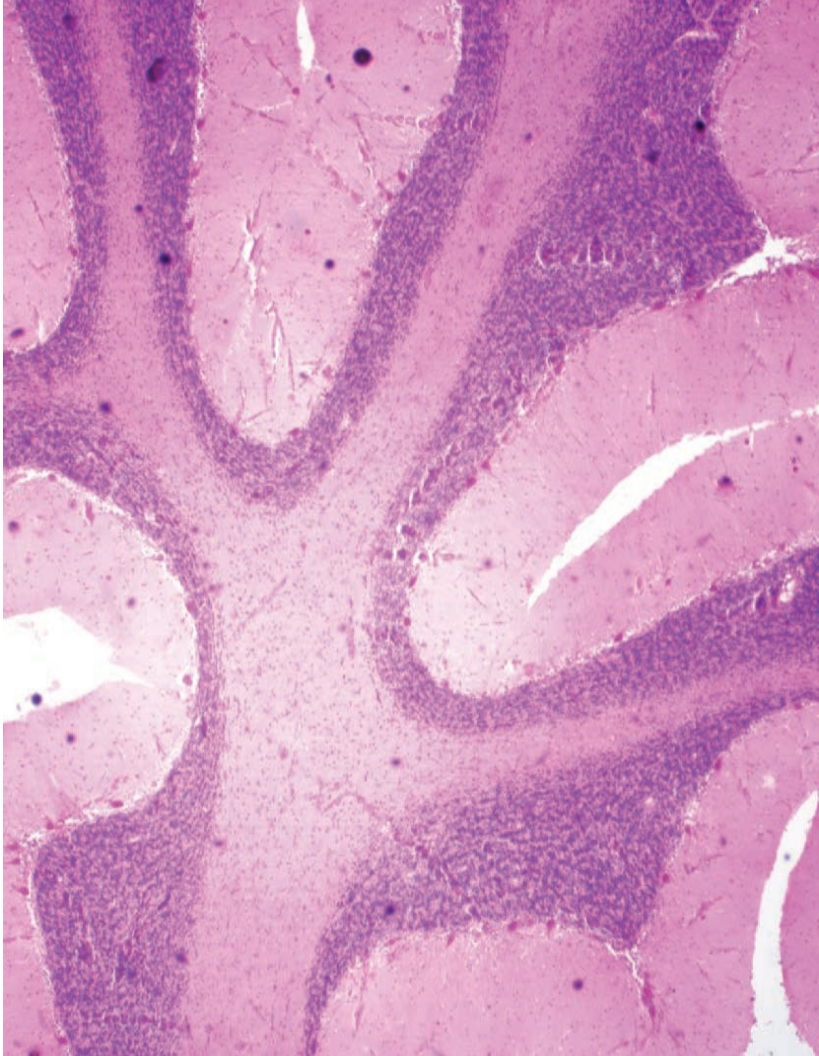
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developments provide a promising outlook on RNA-based therapies being used as cancer treatments.

Through both siRNA and mRNA research, Tino Therapeutics is pushing the boundaries of oncological science by consistently innovating in this emerging field. The company's proven track record of original thinking continues to bring to healthcare new and needed solutions that are poised to change the landscape of cancer medicine and save lives.



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Battle for Women's Global Health: Dr. Susan Cu-Uvin

In the 1980s, an outbreak of Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) spread across the United States. Roughly 20% of the population of gay men in the U.S. contracted HIV in the early 1980s, with some cities seeing almost 50% of the gay population affected. ¹ Within the same period, the prevalence of HIV among women rose to 12%. ² The rise of infectious diseases in minority populations highlighted the need for medical attention in a global context. Practicing physician Dr. Susan Cu-Uvin recognized this urgency and pioneered efforts to combat these infectious diseases from a local to international scale.

Writer: Sirena D'Orazio
Researcher: Viva Voong
Editor: Megan Vu
Designer: Natalie Ho

1. Grulich, A. (2000). HIV risk behaviour in gay men: On the rise? *BMJ*, 320(7248), 1487-1488.

2. Bosh, K. A., Hall, H. I., Eastham, L., Daskalakis, D. C., & Mermin, J. H. (2021). Estimated annual number of HIV infections - United States, 1981-2019. *MMWR. Morbidity and Mortality Weekly Report*, 70(22), 801-806.

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Dr. Cu-Uvin is a Professor of OB-GYN (Obstetrics-Gynecology) and Medicine at the Warren Alpert School of Medicine and serves as Professor of Health Services, Policy and Practice at Brown University's School of Public Health. Passionate about advocating for her female patients, Dr. Cu-Uvin led substantial initiatives to alleviate growing inequities in global health. In 2006, Dr. Cu-Uvin accepted a fellowship position with Dr. Charles Carpenter at the first HIV Menopause clinic for women at the Miriam Hospital, where her research focused on exploring the interactions between menopause and HIV. However, Dr. Cu-Uvin's journey wasn't

🔍 : Background image of uterine cervix specimen

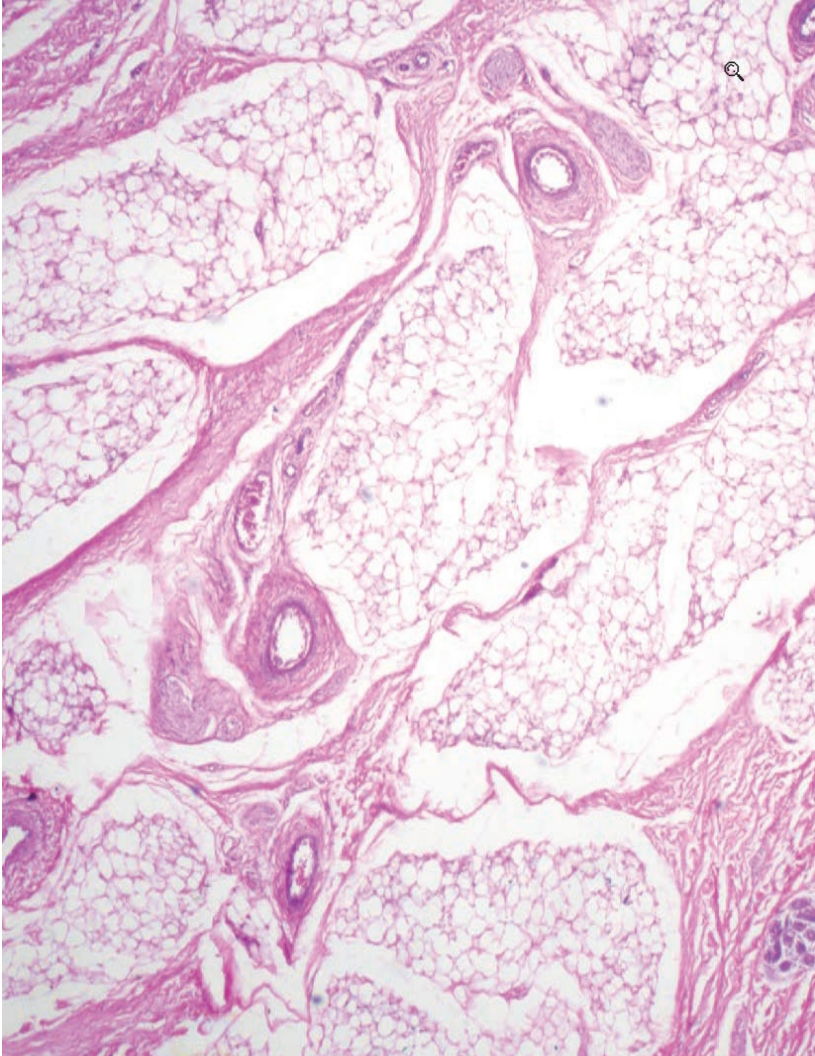
🔍 : Photo of labia majora specimen slide



without its challenges. At the time, Dr. Cu-Uvin's mentors told her that this fellowship was the "death mill" of her career because all the women who contracted HIV died in their twenties before they could get pregnant. Nevertheless, Dr. Cu-Uvin persevered, helping the clinic serve over 280 women.

As HIV and AIDS became a global crisis, Dr. Cu-Uvin's work became more significant on the international level. In 2009, Dr. Cu-Uvin started the Global Health Initiative at Brown University and served as its director. In a video series, "Brown Global Voices," Dr. Cu-Uvin talked about the purpose of the Global Health Initiative. "Our approach to global health is multi-disciplinary. It's not more about diseases, but really about inequities that put populations or people at risk for global health problems." She worked with other faculty to create an international

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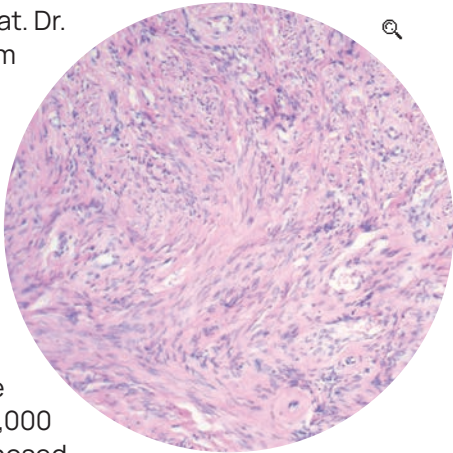
AIDS training program for countries that were most affected by the HIV/AIDS pandemic, including Ghana, Kenya, India, Indonesia, and the Philippines. This program helped to establish a skilled support system of healthcare providers who could treat both men and women with HIV and AIDS.

Today, HIV continues to affect women of reproductive age, especially in low and middle income countries. Two studies done fourteen years apart (in 2007 and 2021) found that women with HIV have about six times the risk of developing cervical cancer compared to women who don't have HIV.³ Yet many countries face a shortage of healthcare services to combat the increased risk of cervical cancer in women with HIV. The pressing need for screenings, preventative care, and treatment for women in Bangladesh inspired Dr.Cu-Uvin to develop a program

3. Castle PE, Einstein MH, Sahasrabudhe VV. Cervical cancer prevention and control in women living with human immunodeficiency virus. CA Cancer J Clin. 2021 Nov;71(6):505-526.



to provide just that. Dr. Cu-Uvin's program trained administrators, nurses, doctors and midwives and established three district hospitals, as well as multiple mobile clinics. They have screened over 73,000 women and diagnosed 25 cases of cervical cancer. The program's impact was extraordinary – 19 of the women treated are alive today because of the program (the remaining six declined treatment).



🔍 : Photo of uterine cervix specimen

During her time working with the program, Dr.Cu-Uvin visited Bangladesh three times a year for two weeks at a time. She recalled that her favorite memories from her work there involved treating women in the mobile clinics. "It's

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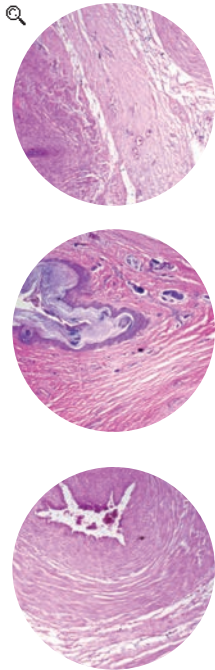
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amazing, sometimes we would have one hundred women in one day. We never stopped until we finished seeing all the women.” Most importantly, she says that this program, and all the global health initiatives at Brown are a “bilateral exchange of information.” The ratio of patients to doctors is very high in low or middle income countries compared to America, and healthcare resources are much more scarce. Because clinicians who work in these countries don’t have access to many of the expensive tests that are used in America, it is critical that they adapt by learning to listen to patients carefully. Many Brown faculty members who participated in these programs learned to hone their clinical skills in order to reduce waste and increase efficiency.

Dr. Cu-Uvin continues to be a leader in the struggle to protect women’s health globally. She is currently the



🔍 : Photos of umbilical cord specimens

Director of the Providence/Boston Center for AIDS Research (CFAR) and the Principal Investigator of a D43 HIV and Cervical CA Training Grant with MOI University in Kenya, which focuses on the pathogenesis, screening, and treatment of HIV-related cervical cancer among women living with HIV. At the time of writing this article, Dr.Cu-Uvin was preparing for a trip to the Philippines to start a new program to establish research projects and train clinicians to treat men and women affected by HIV and AIDS. She is passionate about continuing to establish global health initiatives so that we can facilitate understanding and learn from each other,

🔍 : Photos of sperm specimen slide



especially about clinically pertinent issues like HIV, AIDS and cervical cancer. Dr. Cu-Uvin's unwavering commitment and leadership has led to great progress in women's healthcare on an international scale and has improved access to HIV and AIDS treatment for thousands of women.

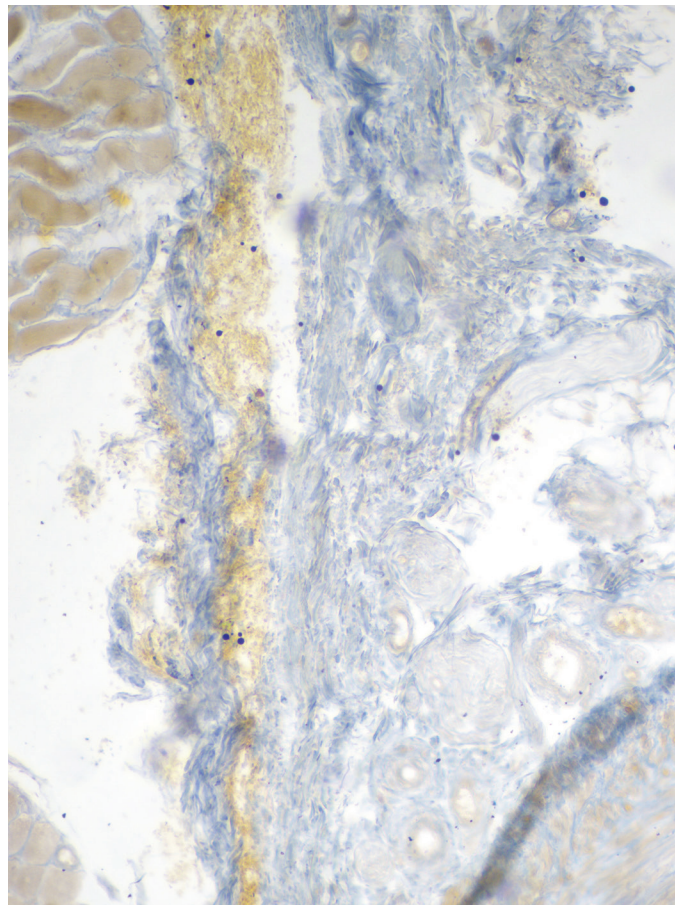
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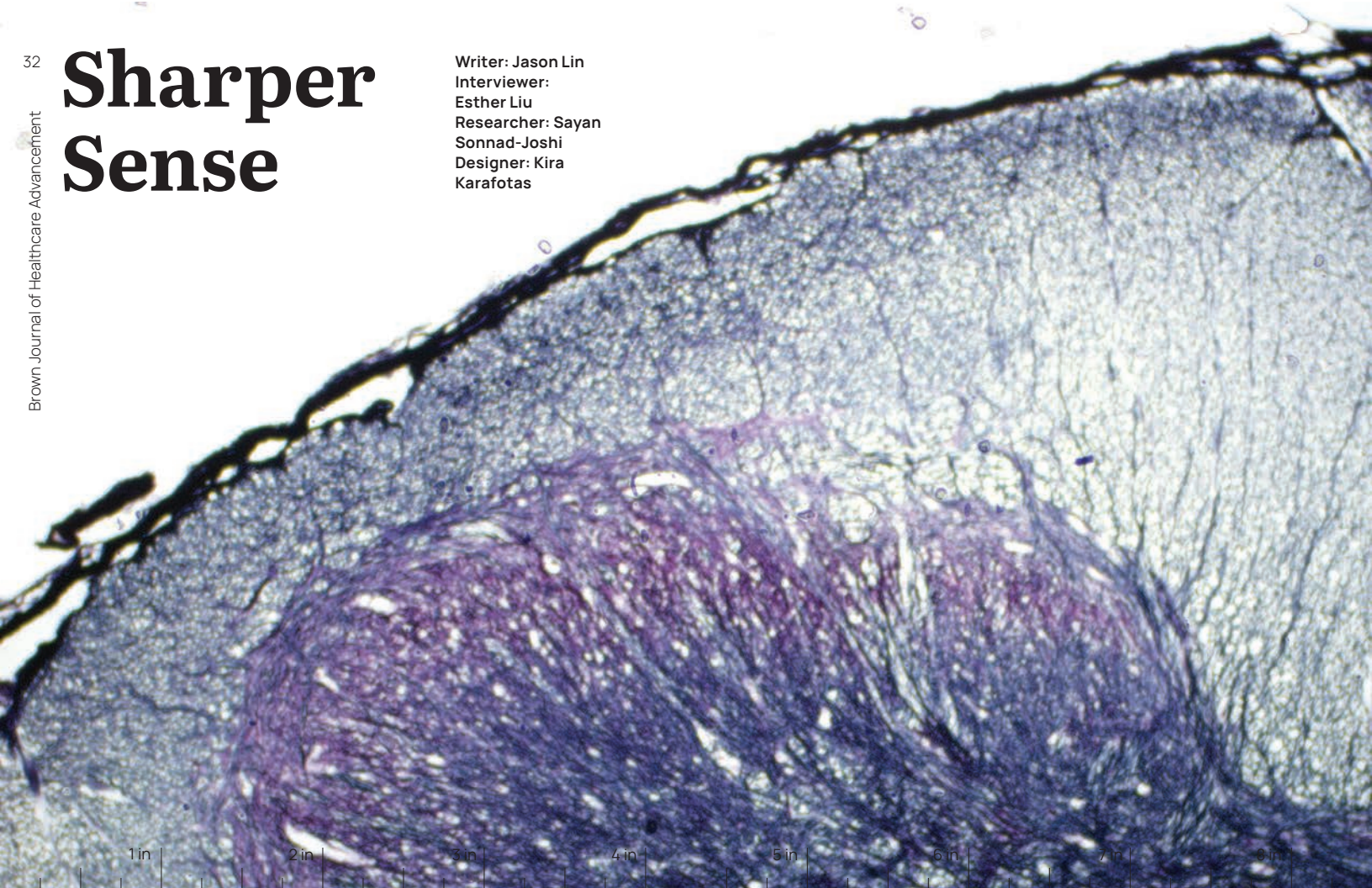
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Sharper Sense

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Esther Liu
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Sonnad-Joshi
Designer: Kira
Karafotas



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A Sharper Sense for Everyone

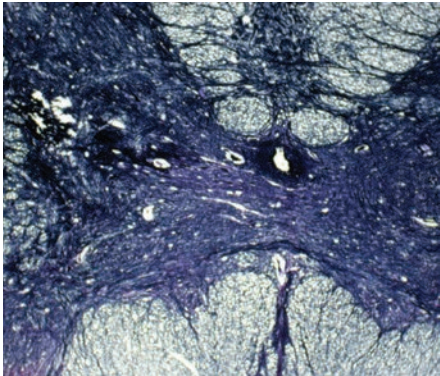


Sensations - they govern the very essence of how we interpret the reality around us. The way we hear, see, touch, smell, and taste is intrinsic to what it means to be humans. However, as we age the acuity of our sensations steadily decreases. According to the CDC, one out of six Americans over the age of 70 has visual impairment and one out of four has hearing impairment. This trend of vision and hearing impairment more than doubled for persons aged 80 years and compared with persons aged 70-79 years¹. As we live longer and longer due to advancements in

🔍: microscopic image of a human spinal cord

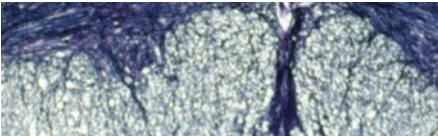
1. Caplan, Z. (2023, May 25). U.S. older population grew from 2010 to 2020 at the fastest rate since 1880 to 1890. United States Census Bureau.

modern healthcare and disease treatment, the need to address such sensory deprivations continues to grow. Worryingly, the US's population as a whole is steadily aging as well. With a new "silver wave" being predicted, in 2020 nearly 1 in 6 Americans were over 65 years old, a jump from the 1 in 20 a century ago.² Our sensations are critical for the ability to function independently and enjoy life, something which Professor Charles Rodenkirsch, CEO of Sharper Sense, understood.



2. Products - Data Briefs - Number 31 - April 2010. (2020).

Sharper Sense promises “neuro-modulation for clear senses”, with a mission to create a “neuromodulation patch that enhances your senses while worn.

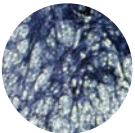
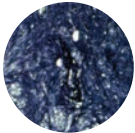


Placed on the neck, it [...] improves accuracy of hearing, vision, and touch”. According to the company’s website: “When alert and attentive, your brain optimizes sensory processing for accurately perceiving details. Sharper Sense activates this natural sensory enhancing mechanism by stimulating a nerve in the neck that connects into the brain.” It also is “noninvasive, safe, and comfortable.” Furthermore, the Sharper Sense Patch can “enhance performance and safety” during tasks that require fine motor control; their need is emphasized

3. Sense, S. (2024).
Sharper Sense.
Sharper Sense.

as “enhanced senses prevent miscommunication and mis-perceptions.” Currently, their client base includes athletes, gamers, operators, artists, students, and older adults.³

Currently, Sharper Sense works through neuromodulation, or the stimulation of certain parts of the brain at specific regions. Specifically, the Sharper Sense Patch is located near the neck and the vagus nerve, where it boosts norepinephrine. The increased levels of norepinephrine stimulate the sympathetic nervous system’s activity and thus improves attention and awareness of the environment. Furthermore, Sharper Sense does not trigger a significant increase in dopamine, which could be detrimental to downstream nerve function. Sharper Sense is unique since it takes a non-invasive approach towards the regulation of neurotransmitters, something



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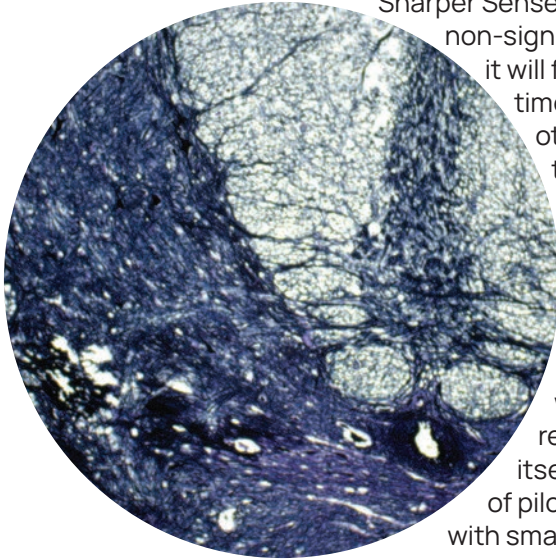
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which has only been managed through the use of pharmaceuticals thus far. Pharmaceuticals are expensive, limited in use, and biologically more wasteful when compared to neuromodulation.

Much of the science and technology behind Sharper Sense is based on significant advancements since 2010 within the growing intersection between brain and computer interfaces. This field is known as “systems/computational neuroscience,” which focuses on the analysis of the brain pathways and perceptions. Dr. Rodenkirch found that performance enhancement could be achieved through neuromodulatory measures. Within rodent models, they found that by recording and reconstructing how brain signals are encoded, they could simulate sensations such as sight and hearing. With Sharper Sense they found that techno-

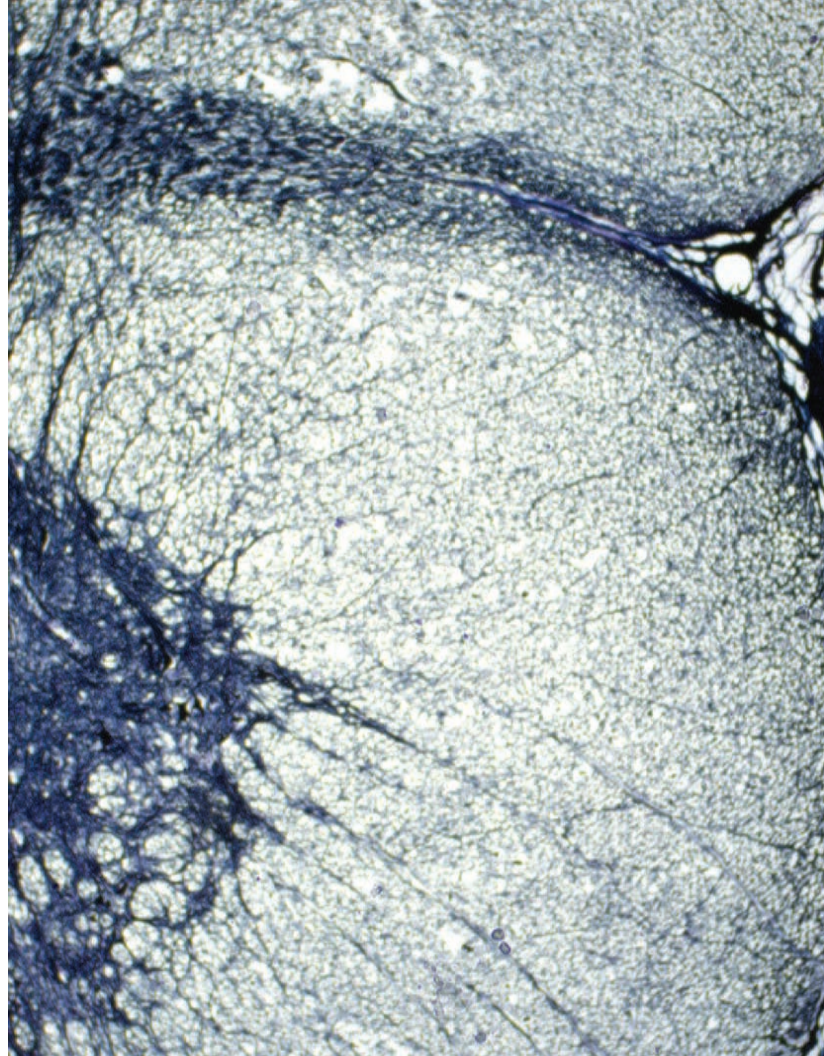


logical stimulation of the neck improves the ability to distinguish between speech and noise.

Dr. Rodenkirch claims that since Sharper Sense is a non-invasive, non-significant risk device it will follow a faster timeline compared to other FDA devices towards patenting and getting on to the market. They plan a period of 5-6 years of preclinical neuroscience work to better refine the device itself and then 2 years of pilot clinical studies with smaller populations of patients to test efficacy. In the final year, they hope to achieve FDA clearance through hardware and clinical trials, which take approximately 6 months.



In the future, Sharper Sense hopes to test their products' interactions with hearing aids and broaden their audience from senior citizens into the larger hearing care market. Sharper Sense represents the promise of neuromodulation, AI, and greater computational power to create a more personable and individualistic medical approach. Through a closed-loop technological approach and novel neurostimulation method, Sharper Sense hopes to make the world clearer for everyone



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Maternova:

The Drive to Improve Maternal Health

The deaths of women during pregnancy and childbirth remain a significant global concern. Every year, nearly 300,000 women die due to various maternal-related conditions, including pre-eclampsia, postpartum hemorrhage, and complications during delivery.¹ This issue is especially severe in low and middle-income countries, with 87% of maternal deaths occurring in Sub-Saharan Africa and Southeast Asia. Most tragically, these deaths are entirely preventable. The technology within modern medicine is fully capable of resolving these health issues yet their limited distribution prevents them from saving lives.²

🔍 : Background image of sperm specimen

Writer: Kainoa Maruoka
Researchers: Olivia Bergin, Sneha Tallam
Editor: Everest Maya-Tudor
Designer: Natalie Ho

1. World Health Organization. "Maternal Mortality." World Health Organization, 2023.

2. Reproductive Health Matters. "Maternal Mortality and Morbidity." Reproductive Health Matters, vol. 29, no. 2, 2021, pp. 1-3.



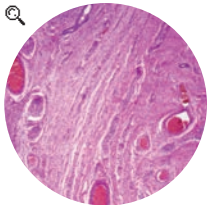
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Access to medical technology is essential to improve women's health outcomes related to pregnancy and childbirth. One of the major challenges in achieving this goal is bridging the gap between the production of such technologies in the Global North and its distribution to communities in the Global South. While these technologies are accessible in high-income nations, they are virtually inaccessible in low and middle-income countries due to factors such as poverty, remoteness of communities, inadequate healthcare infrastructure, and a lack of medical knowledge.³ Therefore, a solution to the issue of high maternal mortality in

3. Smith, Hannah, et al. "Trends and Causes of Maternal Mortality in the United States." National Center for Biotechnology Information, vol. 33, no. 1, 2021, pp. 45-56.

certain nations must address the medical problems directly while also confronting the socio-cultural challenge that hinders access to medical interventions.

Maternova is an international company dedicated to improving maternal health globally by inventing and providing essential technologies for current and expectant mothers. They achieve this goal by researching and supporting maternal health innovations and connecting medical teams worldwide with these life-saving devices. Founded in 2009, Maternova started as a library of mostly low-tech innovations to raise awareness about these products. Over the years, the company evolved into a marketplace, offering a wider range of products, building stronger customer relationships, and increasing outreach to midwives internationally.



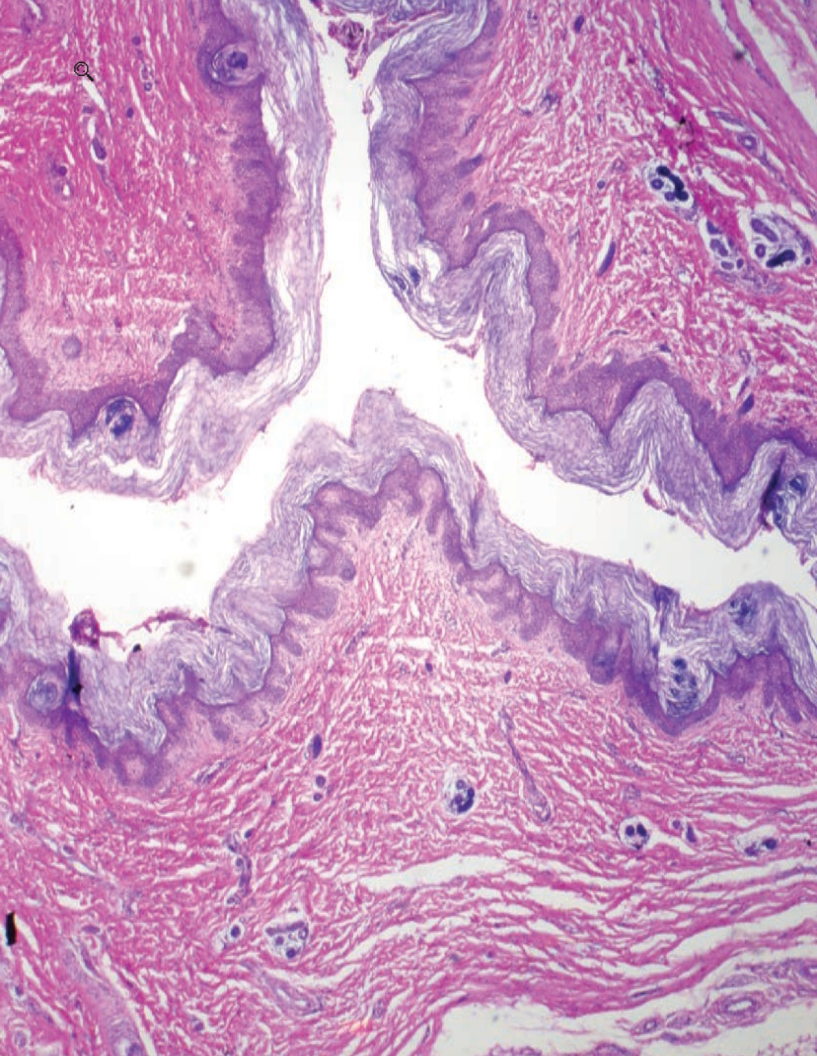
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Today, Maternova sells a variety of maternal and child health technologies wholesale to health systems in over 180 countries, reaching over 2 million women and infants. Maternova's headquarters are located in downtown Providence, Rhode Island, where they continue to work toward expanding maternal health globally.

We spoke with Meg Wirth, Maternova's Founder and President, about the company's journey, products, and future vision. Wirth explained that she started Maternova to address global maternal mortality, a growing concern she was deeply

🔍 : Photo of umbilical cord specimen slide





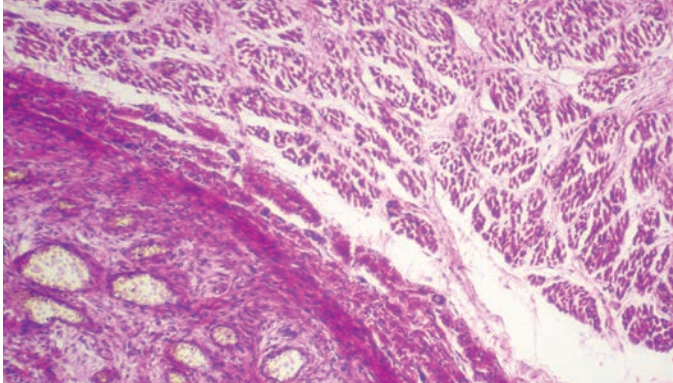
interested in. From her previous work with married teen mothers, she realized that pregnant women of low socioeconomic status often lacked sufficient resources to support both their children's health and their own. Although Wirth was involved with maternal mortality projects, it became increasingly frustrating as she saw projects culminate in a restatement of the issue at hand rather than taking action to reduce mortality rates. During a maternal mortality project in Indonesia, Wirth witnessed the inventiveness of midwives and their crucial role in providing prenatal and postpartum care in low-income communities. Wirth decided to take action to create medical innovations that could be utilized by midwives to expedite improvements in maternal mortality.

Wirth specifically discussed the CRADLE Vital Signs Alert (VSA)

device, a device designed by hypertension experts in the United Kingdom to monitor pregnant women's well-being in low-cost environments with limited trained medical professionals. With more than half of maternal mortality resulting from hemorrhage, hypertensive disorders, and sepsis, Wirth mentioned that it was important to create a device that was able to monitor the vital signs of pregnant women in order to diagnose pathologies before they progressed to a fatal level. The CRADLE VSA is not only a highly functioning vital signs monitor but also incorporates a color-coded light scale based on the shock index of the vital signs report. ⁴ For instance, a green light

4. Maternova. "Our Story."

🔍 : Photo of embryo specimen slide



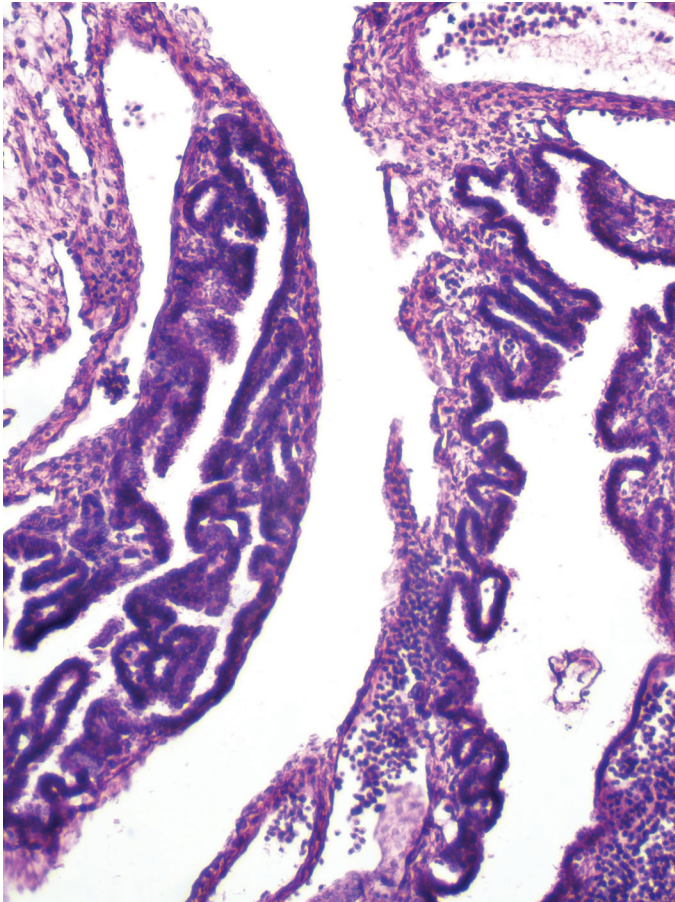
🔍 : Photo of labia majora specimen

would indicate that the patient is okay, while a red light is a signal that immediate care is needed. This algorithm ensures that reliable diagnoses are made without requiring highly trained medical professionals, making the CRADLE VSA an effective device in low-resource contexts. After 12 years of clinical trials in the United Kingdom, the CRADLE VSA was introduced to the market and is being used in many communities and even higher-level hospitals around the globe.

Maternova sources many other innovative, low-cost, and maintenance maternal and newborn products. For example, the Pratt Pouch, a portable pre-dosed antiretroviral device, is a simple solution that has the potential to stop a large percentage of new HIV infections each year. Additionally, the Non-pneumatic Anti-Shock Garment serves as a unique first-aid device to stabilize women experiencing obstetric hemorrhage by applying uniform compression over the entirety of the lower body.

By bridging the gap between advanced medical technology and its distribution in underserved areas, Maternova is helping to transform maternal care worldwide, reaching more than 180 countries. Their low-cost, effective, and innovative targeted solutions to a variety of maternal health issues pave the way for a future where equitable maternal healthcare is a reality for all.

© : Photo of embryo specimen



Empowering Preventative Healthcare

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Smart Rose’s Innovative Health Approach



Preventative care has become secondary to acute treatment in the U.S. healthcare system. As of 2021, approximately 90% of healthcare expenditures in the U.S. are directed toward treating acute diseases or injuries rather than preventing them.¹ However, modern digital health platforms promise to empower patients to be proactive in their health journey and transform care delivery through continuous personalized data-driven insights. Mobile health (mHealth) technologies in particular directly connect individuals to their health

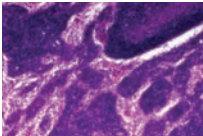
🔍: microscopic image of a human pancreas

1. Abernethy, A., Adams, L., Barrett, M., Bechtel, C., Brennan, P., Butte, A., Faulkner, J., Fontaine, E., Friedhoff, S., Halamka, J., Howell, M., Johnson, K., Long, P., McGraw, D., Miller, R., Lee, P., Perlin, J., Rucker, D., Sandy, L., Savage, L., ... Valdes, K. (2022). The Promise of Digital Health: Then, Now, and the Future. NAM perspectives, 2022, 10.31478/202206e.

data, encouraging patients to take an active part in managing their health journey.²

Emerging as an mHealth startup, Smart Rose is taking an innovative approach to increase access to preventative care management. Founded in 2023 by Rutgers University graduates Akshaj Tyagi and Johnny Vishnevskiy, the company’s goal is to develop the most effective longevity and wellness system available—a system that empowers people to take control of their health to maximize their lifespan and healthspan. By empowering individuals to manage their wellness proactively, Smart Rose CEO Akshaj Tyagi aims to “build the first generation that avoids illness through sustainable healthy habits.”

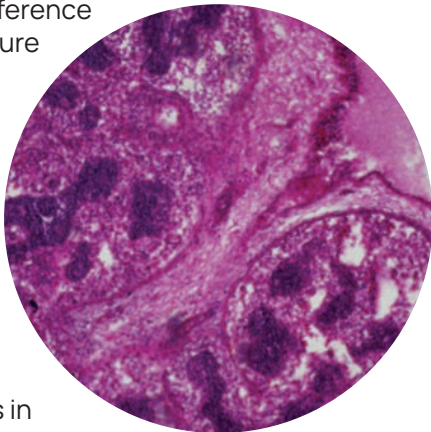
The key to their approach is smart



2. Wang, H., Ho, A. F., Wiener, R. C., & Sambamoorthi, U. (2021). The Association of Mobile Health Applications with Self-Management Behaviors among Adults with Chronic Conditions in the United States. International journal of environmental research and public health, 18(19), 10351.



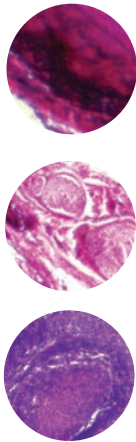
sensors and personalized “Smart Programs.” Under the Smart Rose basic bundle, users are provided a suite of smart sensors, including a ring, waist circumference device, blood pressure monitor, chest ECG strap, and weight scale. The Smart Rose app continuously collects and analyzes data from the various sensors. Using advanced algorithms, it identifies trends and patterns in users’ physiology, activity, sleep, and other lifestyle factors to provide a simple, easy-to-understand “Body Age” score. This metric reflects how users’ bodies age based on their physiology and lifestyle factors, providing a clear,



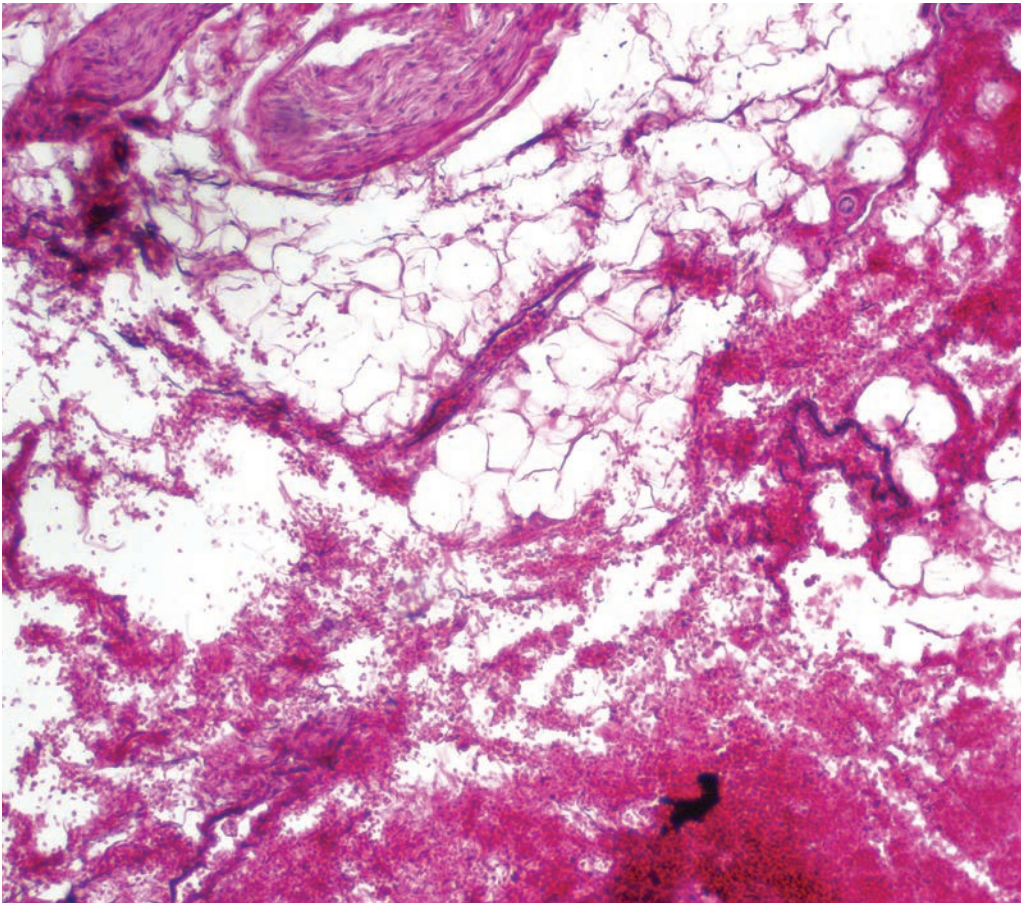
concrete way to understand how their body performs compared to their chronological age.

Under Smart Rose’s pro program, users get access to “Smart Programs.” Given the trends observed by the aforementioned algorithm, the app’s built-in AI assistant “Rose” asks the users a set of personal qualitative questions. By combining this qualitative feedback with users’ day-to-day health data, the app generates a customized wellness program tailored to the individual’s specific needs and goals. Irrespective of one’s subscription, Smart Rose never has direct access to users’ health data, which remains securely stored on each individual’s device. This restriction helps maintain users’ privacy while still providing personalized guidance.

What sets Smart Rose apart is



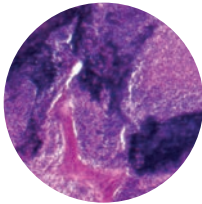
its intelligent, adaptive coaching style that goes beyond providing generic health advice. They take into account the user's unique biology, habits, and health status to prescribe a precise regimen of activities, behaviors, and lifestyle changes. For example, the program might recommend a specific daily step count, frequency of cardiovascular exercise, and adjustments to sleep and diet—all calibrated to the individual's current "Body Age" and designed to gradually reduce that number over time. The app does not simply provide a plan and leave the user to their own devices; it actively monitors progress and provides regular feedback, adjusting the program as needed to ensure the user stays on track. Conversely, if the user is exceeding their targets, the app will introduce new, more challenging goals to drive continuous improvement. The result is a solution that does not just track metrics but helps



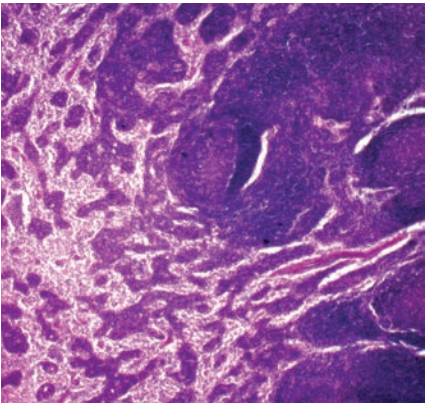
users make sustainable, substantial changes to their health and lifestyle.

Smart Rose's launch comes at a critical time as the COVID-19 pandemic has underscored both the importance of preventative healthcare and the limitations of the current system. By making holistic wellness management more convenient and affordable through their innovative technology platform and services, Smart Rose seeks to empower individuals to proactively care for their health and develop long-lasting healthy behaviors. Their model could help address public health priorities like reducing rates of chronic diseases, while also advancing health equity across communities.

After piloting their services, Smart



Rose has fully launched this summer with an affordable subscription model.³ They aspire to make personalized health and wellness management more accessible and affordable than alternatives like the Apple Watch or Aura Ring. Despite significant market competition, particularly in the wearable ring sector, Smart Rose aims to carve out a niche with its focus on longevity and comprehensive wellness.

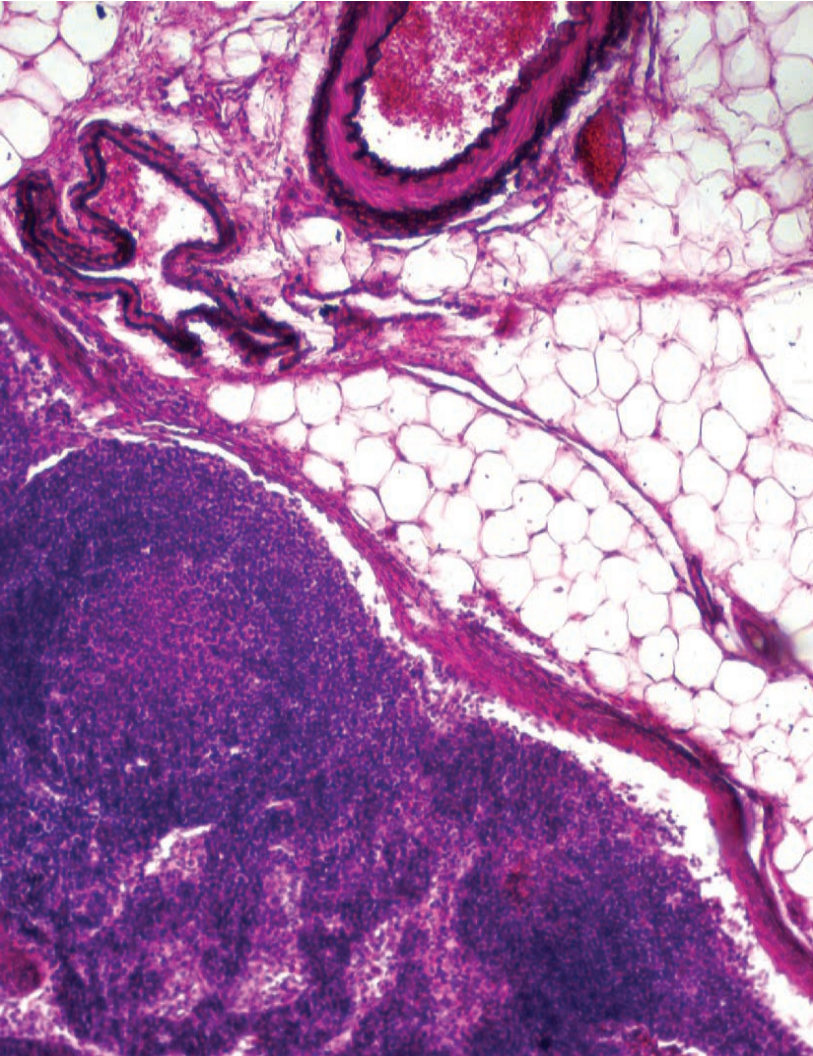


3. Tyagi, A. (2024). Smart Rose.



As Smart Rose expands its capabilities, it plans to scale its offerings to encompass additional areas of preventative healthcare management. For example, they hope to incorporate services like DNA analysis and glucose monitoring to provide more comprehensive insights into metabolic health, genetic predisposition to disease, and more complex risk assessments.

As of August 2024, Smart Rose's level of early adoption indicates room for growth and an opportunity to optimize their market strategy. By combining advanced sensors, evidence-based supplements, and personalized AI-driven insights, Smart Rose aspires to be a leader in the consumer health technology sector. Their mission is ambitious yet clear: help people live longer by preventing diseases through proactive health management



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Innovating Healthcare

: Insights and Inspiration from Leaders in Public Health and Academia

On a notable evening at Brown University, the Brown Journal of Healthcare Advancement co-hosted an event titled “A Dinner and Conversation,” featuring two distinguished guests: Provost Frank Doyle¹, who is a professor of Engineering and the 14th provost of Brown University, and Dr. Scott Rivkees², who serves as the Associate Director of the Accelerated Master of Public

Writer: Pierre Jolin,
Krish Shah
Designer: Janice Lee



1. Frank Doyle focuses on developing new methods of insulin delivery and in systems biology.



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2. Scott Rivkees served as Surgeon-General of Florida during the COVID-19 pandemic.

Health Program. The evening consisted of a rich dialogue on innovation in healthcare and public health, where both speakers shared insights from their illustrious careers, answered probing questions, and offered advice to the students in attendance. This event highlighted the intersection of academia, public policy, and medical innovation, drawing on the experiences and wisdom of two leaders in their respective fields.

Dr. Scott Rivkees began the conversation by reflecting on his journey from Northern New Jersey, from being the first in his family to attend medical school to cultivating a diverse career that spanned multiple states and prestigious institutions. His path took him through significant roles at Massachusetts General Hospital, Yale University, and eventually to Florida, where he served as Surgeon General during the height

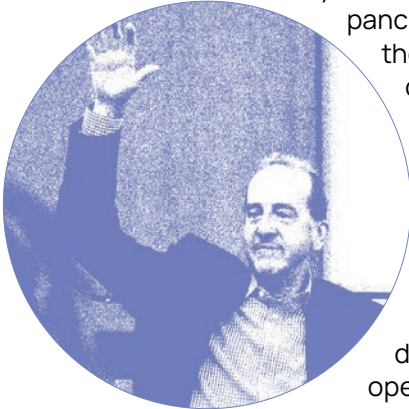


of the COVID-19 pandemic. Dr. Rivkees provided a candid account of his experiences in Florida, particularly during the politically charged environment of the pandemic. His decision to leave Florida on his terms underscored the challenges he faced when politics began to overshadow public health efforts. This reflection not only offered a glimpse into the personal challenges of leading during a crisis but also highlighted the resilience and commitment required in public health roles.

Provost Frank Doyle, with a background in chemical engineering and a PhD in feedback controls, shared his journey from Delaware to leading significant academic and research initiatives across the country. His



career trajectory, which included roles at DuPont, the University of California Santa Barbara, and Harvard, exemplified the blend of engineering and biotechnology.



Doyle's work on the artificial pancreas and his vision for the future of biomedical devices showcased the potential for innovation in health-care technology. He spoke of the next frontier in biomedical engineering—fully automated medical devices that could operate “invisibly” like pacemakers yet had the capability to monitor and respond to patient needs autonomously³.

This vision of seamless, integrated medical technology offers a promising future for patient care, particularly in reducing human error and increasing efficiency in medical treatment.

3. Drug infusion automation through sophisticated feedback systems, and sensor development in medical diagnostics will be revolutionary.

As the conversation shifted to the role of information in public health, Dr. Rivkees highlighted the stark contrast between the rigorously vetted information of the past and the overwhelming influx of unverified data in the present. He discussed the challenges policy-makers faced during the pandemic, particularly in discern incredible information amidst a sea of misinformation⁴. The rise of the anti-vaccine movement and the subsequent discrediting of experts underscored the significant impact that disinformation can have on public health. Rivkees's reflections emphasized the need for vigilance and critical thinking in navigating today's complex information landscape.

The discussion also touched on the academic peer review process, a cornerstone of scientific rigor that, as both speakers acknowledged, can sometimes be hampered by bureaucracy. The pandemic,

4. This is seen in the pandemic, when red and blue states initially implemented similar strategies before the emergence of the anti-vaccine movement.



however, forced a reevaluation of this process, leading to more rapid dissemination of information through platforms like MedRics⁵.

This adaptation illustrated the delicate balance between maintaining scientific integrity and responding to urgent public health needs. In addressing the role of academic institutions in fostering innovation, both Doyle and Rivkees stressed the importance of creativity, entrepreneurship, and perseverance. They advocated for universities to provide pathways for innovative ideas such as seed grants and for students to actively seek out and seize opportunities for learning and development. Doyle referenced his constant habit of continuously reading and staying updated on current trends, while Rivkees recalled his mentor's mantra of "focus, focus, focus" which has allowed him to uphold his passion for the subject of public health.

5. The anti-science movement has influenced how people view published information.



Their advice to students was clear: be curious, manage your time effectively, and stay focused on your passions.

“Pursue your passion, value curiosity.”

The event concluded with a powerful message about the importance of following one's passion and remaining committed to one's goals, even in the face of challenges. Both Doyle and Rivkees exemplified this mindset through their careers, inspiring the next generation of leaders in healthcare



and public policy. “A Dinner and Conversation” was more than just an exchange of ideas; it was a call to action for students to engage deeply with their work, innovate fearlessly, and contribute meaningfully to the future of healthcare and public health.



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Q : Behind the scenes of students and experts engaging at the event.

Specimens



Cerebral Cortex
○ Sec. 31-3636
RISD Nature Lab

Brain Tissue
Sec.
RISD Nature Lab



Uterine Cervix
○ Sec. H 8495
RISD Nature Lab

Labia Maj.
Set 158 #181
RISD Nature Lab



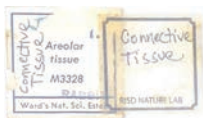
Sperm
○ Set 14 #173
RISD Nature Lab

Lung
Set. 65 #37
RISD Nature Lab



Lymph Node
○ Set 8 #28
RISD Nature Lab

Pancreas
Set. 58 #63
RISD Nature Lab



Connective Tissue
○ Sec. M3328
RISD Nature Lab

Spinal Cord
Set.
RISD Nature Lab



Embryo
○ Sec.
RISD Nature Lab

Umbilical Cord
Set. 57 #9
RISD Nature Lab



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