NIH RESEARCH IN ACTION

How NIH-funded research is making a difference for patients, families and communities

Amazing Things

America's investment in biomedical research through the National Institutes of Health makes amazing things possible. **The three amazing examples highlighted here will help save and improve lives.** They also illustrate the powerful ripple effect of NIH-funded research and how knowledge and discovery often build on each other, enabling the pursuit of new and life-changing innovations.

1

Shedding New Light on Skin Cancer: AI-Powered Device Improves Detection

A newly available device makes it easier for clinicians to determine whether an irregular patch on the skin is innocent or something more concerning, often without the need for an invasive biopsy. Approved by the U.S. Food and Drug Administration (FDA) in January 2024, the **DermaSensor** can detect the most frequent forms of skin cancer, basal cell and squamous cell carcinomas, as well as the rarer but more dangerous melanoma, with 96% sensitivity across 224 cancers. Importantly, it works equally well on different skin tones.

The device utilizes elastic scattering spectroscopy (ESS), developed by **Boston University's Irving J. Bigio** with research funding from the National Cancer Institute (NCI). ESS works by directing pulses of light at tissue and analyzing which colors of light bounce back to reveal important information about cellular and subcellular structures. The DermaSensor employs an AI-powered algorithm to interpret this spectral data, distinguishing between malignant and benign lesions based on how they scatter light.

Beyond its use to detect skin cancer, ESS has many other potential applications. Bigio and clinical collaborators have conducted multiple NIH-funded studies demonstrating the technology's potential to help pinpoint the locations of tumors, measure the effectiveness of cancer medications, detect malignant thyroid nodules, and differentiate normal from abnormal polyps during a colonoscopy.

📝 **READ MORE ABOUT THE DERMASENSOR'S DEVELOPMENT**

There will be an estimated

100,640

new cases of melanoma diagnosed in the U.S. in 2024

and **8,290**

melanoma-related deaths.

Source: American Cancer Society

DermaSensor

TIME **BEST** INVENTIONS 2024

DermaSensor was named a 2024 **"Best Invention"** by TIME magazine.

> " The FDA designated this as a breakthrough technology, which means they gave it higher priority for review because they see it as having a real impact"

IRVING J. BIGIO, PHD
Professor of Biomedical Engineering and Electrical and Computer Engineering
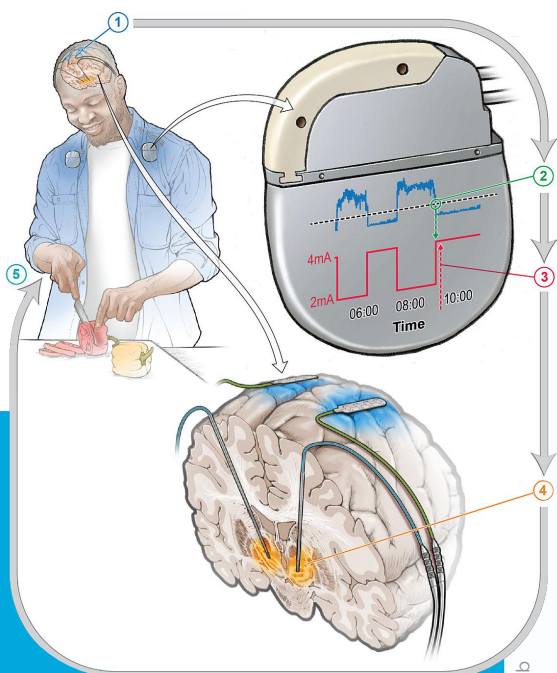*Boston University*

Source: Starr lab

2

Self-Adjusting Brain Pacemaker Reduces Parkinson's Disease Symptoms

A **small feasibility study** has shown the potential of a new form of deep brain stimulation (DBS) to significantly improve symptom control in Parkinson's disease (PD) patients.

Conventional DBS, which has been used for many years to treat people with PD and other brain disorders, involves implanting electrodes into the brain at certain locations to deliver constant electrical signals that can help mitigate PD symptoms, much like a pacemaker sends electrical pulses to a heart. However, this constant stimulation can lead to unwanted side effects.

In contrast, the study looked at adaptive deep brain stimulation (aDBS), which uses machine learning to automatically adjust stimulation levels based on the patient's real-time brain activity. By tailoring treatment to the person's individual needs, aDBS improved each patient's most bothersome PD symptom by roughly 50 percent compared to conventional DBS.

The study is a continuation of **years of work by Philip Starr, MD, PhD,** and colleagues at the **University of California, San Francisco (UCSF).** It received NIH support through both the **National Institute of Neurological Disorders and Stroke (NINDS)** and **The BRAIN Initiative.**

While these results mark a major step forward, challenges remain before aDBS can be more broadly tested or used. Currently, initial setup and fine-tuning of the device requires highly trained technicians and is time consuming. Researchers envision a future where most of the work could be done by the device itself.

📝 **READ HOW aDBS CHANGED ONE PD PATIENT'S LIFE**

Nearly

1 million

people in the U.S. are living with PD and nearly

90,000 people

are diagnosed with PD each year.

Parkinson's is the second-most common neurodegenerative disease after Alzheimer's disease.

Source: Parkinson's Foundation

> " It's like turning back the clock on Parkinson's Disease to give people function like when their symptoms were very well-controlled and mild."

PHILIP STARR, MD, PHD
Co-director, UCSF Movement Disorders and Neuromodulation Clinic

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3

Fast-Track Genomics: Connecting Myeloid Patients to Targeted Clinical Trials

The speed, throughput, and accuracy of next generation sequencing technology has revolutionized genomic analysis, advancing research and innovation across countless health and scientific disciplines. The NIH's **National Cancer Institute** and **Thermo Fisher Scientific** are partnering on an umbrella trial to leverage this technology in treating acute myeloid leukemia (AML) and myelodysplastic syndrome (MDS), two aggressive blood and bone marrow cancers. The trial aims to accelerate the process of matching AML and MDS patients to appropriate clinical trials and treatments, potentially improving outcomes through faster, targeted interventions.

The **myeloMATCH** (Molecular Analysis for Therapy Choice) Precision Medicine clinical trial uses Thermo Fisher's Genexus advanced **gene sequencing technology** to analyze a patient's bone marrow and blood for certain genetic markers within 24 hours. This is a key step in the trial infrastructure to enable screening results and sub-study assignment within about 72 hours of when the lab receives their specimens.

"[To] choose the best treatment option for our patients requires knowledge of the genetic changes that underlie the disease, which vary between patients. This information is needed quickly in order to begin effective therapy for very aggressive cancers," said **Dr. Harry P. Erba, chair of the Southwest Oncology Group** (SWOG) Leukemia Committee and co-chair of the myeloMATCH Senior Science Council. **"Through this personalized approach to treatment, we believe we will increase the number of people who are leukemia survivors."**

📝 **READ MORE ABOUT THE MYELOMATCH TRIAL**

Thermo Fisher SCIENTIFIC

Source: Thermo Fisher/Business Wire

AML accounts for about

1 out of 3 leukemias in adults. About **20,800** people in the U.S. will be diagnosed with AML in 2024 and about **11,200** will die from **AML**. The number of people diagnosed with **MDS** each year is not certain; it has been estimated to be

10,000 or higher.

Source: American Cancer Society

> " myeloMATCH is an immense step forward for patients with aggressive and rapidly advancing cancers who need better treatment options."

JOHN SOS
Senior Vice President and
President, Life Sciences Solutions
Thermo Fisher Scientific

Source: oncomine.com