BIOELECTRONIC MEDICINE: A PRIMER FOR JOURNALISTS

ALLIANCE for ADVANCING
BIOELECTRONIC MEDICINE

Now is the ideal time to cover bioelectronic medicine. This is one of the most innovative and fast-growing fields in healthcare—with an accelerating pace of research advances and a market projected to more than double in the next decade.

In the long-term, the field has the potential to deliver important new treatments in areas of unmet need, integrate advanced technologies like AI, and address the global need for healthcare.

While bioelectronic medicine has existed for decades, recent advances have expanded applications into new areas and attracted growing coverage from sources like *TIME, The Boston Globe, The Atlantic, McKinsey & Company*, and more. Yet bioelectronic medicine remains largely overlooked among the public and even within the life sciences industry—opening opportunities for compelling stories on one of the most exciting areas of healthcare.

WHAT IS BIOELECTRONIC MEDICINE — AND WHY IS IT INTERESTING?

Bioelectronic medicine is a rapidly growing field that uses targeted electrical signals to harness the body's natural mechanisms to diagnose and treat a range of diseases. It includes widely known devices like pacemakers, but also a growing number of applications for diseases where current treatments fall short for some patients, such as Parkinson's, major depressive disorder, incontinence, epilepsy, chronic pain, uncontrolled hypertension, and others.

In recent years, researchers and companies have prepared a new wave of these innovations to enter the market—making the field an exciting topic for a number of reasons:

- **The frontiers of medicine.** Bioelectronic medicine represents not just a narrow category of medical devices, but an entire approach to detecting and treating disease—using electrical pulses and the body's own mechanisms as an adjunct or alternative to drugs and surgical procedures. This means the field is poised to deliver important advances, potentially much like the rise of biotechnology in the 1970's and 80's.
- **Bold research advances.** Researchers are steadily driving advances to expand bioelectronic medicine's potential to help more patients, including trials examining treatment-resistant depression,[1,2] uncontrolled hypertension,[3] PTSD,[4] and others. The field also features fascinating scientific developments like ultrasound waves for nerve stimulation,[5] implantable nerve stimulators that the body can naturally absorb after treatment,[6] AI to diagnose arrythmias,[7] 3D-printed nerve stimulators,[8] and more.
- **Transformative potential.** As bioelectronic medicine devices continue to enter the market and reach more patients, they have the potential to significantly advance healthcare in key disease areas. This is represented by the growth of the bioelectronic market, which is projected to more than double from $22.6 billion market in 2019 to more than $60 billion in 2029, according to IDTechEx.[9]

CURRENT APPLICATIONS AND FUTURE POTENTIAL

Bioelectronic medicine includes a broad range of disease areas and devices spread across a number of sub-fields. The most well-developed of these is cardiac rhythm management, which addresses heart rhythm disorders with devices like pacemakers and includes electrophysiology, focusing on catheter-based approaches.

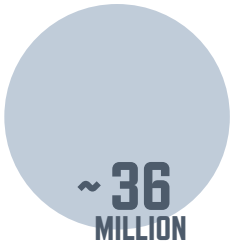
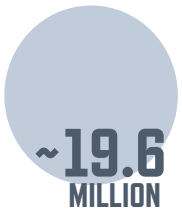
Neuromodulation is a relatively newer field that focuses on stimulating specific nerves in the central nervous system or peripheral nervous system. These include applications for deep brain stimulation, spinal cord stimulation, vagus nerve stimulation, and sacral nerve stimulation. Bioelectronic medicine also includes cochlear and retinal implants.

SUB-FIELDS OF BIOELECTRONIC MEDICINE

Sub-Field	Examples of Devices	Examples of Diseases
Cardiac Rhythm Management	Pacemakers, implantable cardioverter defibrillators, catheter-based treatments for arrythmias	Bradycardia, tachycardia, heart failure, atrial fibrillation
Central Nervous System Stimulation	Devices that stimulate the spinal cord or specific regions of the brain	Chronic pain, treatment-resistant epilepsy, Parkinson's, depression
Peripheral Nervous System Stimulation	Devices that stimulate the vagus nerve or sacral nerve	Rheumatoid arthritis, IBD, overactive bladder, urinary incontinence
Cochlear and Retinal Implants	Implants that capture, digitize, and transmit sound or visual information	Hearing loss/impairment, retinal degeneration

POTENTIAL GROWTH AREAS FOR BIOELECTRONIC MEDICINE

Bioelectronic medicine also has potential to grow in areas where existing pharmaceutical and surgical treatments have only limited efficacy or significant side effects, such as high-impact chronic pain, refractory major depressive disorder, and uncontrolled hypertension.

DISEASE AREA	NUMBER OF PATIENTS (U.S.)	BIOELECTRONIC MEDICINE POTENTIAL ROLE
Uncontrolled hypertension[10]	 ~36 MILLION	Option in cases where other treatments fail or with adherence challenges
High-impact chronic pain[11]	 ~19.6 MILLION	Alternative to opioid treatment
Atrial fibrilation[12]	 ~2.7-6.1 MILLION	Option in cases where medication fails
Refractory major depressive disorder[13]	 ~4 MILLION	Adjunct to pharmaceutical treatment
Parkinson's disease[14]	 ~1 MILLION	Option to address symptoms when not adequately controlled by medication

LEARN MORE: AABM CONTACT AND BACKGROUND RESOURCES

The Alliance for Advancing Bioelectronic Medicine (AABM) is a new multi-sector coalition dedicated to fostering growth and facilitating connections across the emerging field of bioelectronic medicine. Our members are an independent network of professionals and experts, and we work to build support with key stakeholders for innovation at the intersection of healthcare and technology.

We recommend the resources below for an overview of the field, its current state, and its long-term potential:

Overview of the Field & AABM's Vision

- Building A Bioelectronic Medicine Movement: Insights from Leaders in Industry, Academia, and Research (*AABM*)

Quick Reads

- Why It's Time to Take Electrified Medicine Seriously (*TIME*)
- Bioelectronics 'jump-start' the next wave of device therapeutics (*McKinsey & Company*)

Deep Dives

- Bioelectronics: the promise of leveraging the body's circuitry to treat disease (*Bioelectronics in Medicine*)
- 2018 Bioelectronic Medicine Roadmap (*Semiconductor Research Corporation*)

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ENDNOTES

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