

MEDICAL BREAKTHROUGHS **RESEARCH SUMMARY**

TOPIC: HEART MONITOR SMALLER THAN A POSTAGE STAMP
REPORT: MB #4789

BACKGROUND: Cardiovascular health is typically measured by a number of devices. An echocardiogram also called an echo, uses an ultrasound to show how a patient's heart muscles and valves are working. An EKG also called an electrocardiogram, determines heart rate, heart rhythm, and other cardiac information that can help diagnose arrhythmias, heart attacks, pacemaker function, and heart failure. Or a simple listen by a physician through a stethoscope to determine heart rhythm, heart rate, and general cardiac function. "These technologies can often be invasive to patients and have not yet been adapted into wearables for personalized on-demand monitoring," Wenzhuo Wu of Purdue University said.

(Sources: <https://www.practicalclinicalskills.com/what-is-an-ekg#:~:text=An%20EKG%20is%20a%20paper,information%20regarding%20the%20heart's%20condition>, <https://www.webmd.com/heart-disease/guide/diagnosing-echocardiogram#1>)

CURRENT TECHNOLOGY: Wearable heart monitors already exist in a consumer fashion. These are things like smartwatches, fit bits, pulse oximeters, and so on. While these are convenient and practical for casual use, there is still a need for greater accuracy in order to apply them in the medical field. The U.S. Food and Drug Administration currently considers wrist-worn heart rate monitors as low risk devices, obviating legal requirements for approval and regulation. However even with the low accuracy rates, clinicians acknowledge the data derived from these devices is going to play an increasingly important role in the future of healthcare.

(Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6603497/>)

NEW TECHNOLOGY: Now, a team at Purdue University has developed a self-powered, wearable, triboelectric nanogenerator, also called TENG with polyvinyl alcohol-based contact layers, designed for monitoring cardiovascular health. Wenzhuo Wu of Purdue University said, "TENGs with PVA blend contact layers produce fast readout with distinct peaks for blood ejection, blood reflection in the lower body, and blood rejection from the closed aortic valve, which may enable detection of common cardiovascular diseases such as cardiovascular disease, coronary artery disease and ischemic heart disease." The PVA-based triboelectric devices utilize the mechanical energy produced by the human body and use the electric power to support the biomedical device operations.

(Source: Wenzhuo Wu, Ph.D., Ravi and Eleanor Talwar Rising Star Assistant Professor, School of Industrial Engineering, Purdue University, <https://www.purdue.edu/newsroom/releases/2020/Q3/invention-offers-new-option-for-monitoring-heart-health.html>)

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If this story or any other Ivanhoe story has impacted your life or prompted you or someone you know to seek or change treatments, please let us know by contacting Marjorie Bekaert Thomas at mthomas@ivanhoe.com