Crowdsourcing Innovations in Biotech

UNIT 1 RECAP

Unit 1 focused on biomarkers and why the information collected from wearable technology is quickly becoming an important indicator of a person's health. Errors in cell division can be linked to infectious and chronic diseases and studying cell lines in a laboratory can give us important information about cellular mutations and processes, bringing up important bioethical questions. Data collected in bioinformatics is being used to determine how biomarkers can help diagnose disease. Wearable technology can provide early detection or help patients diagnosed with infectious or chronic disease by giving real-time biomarker information to the wearer. The final project for Unit 1 explored the use of crowdsourcing biomarker data from wearable technology to help solve local and global problems. Video presentations demonstrated how wearable technology could help patients using biomarkers as indicators of health.

INSPIRATION 1

One in five Americans wears a smartwatch and ironically, one in five Americans also lives with a mental illness. With the popularity of smartwatches only increasing for people of all ages, could these watches that already help collect biomarker data about heart disease and sleep quality be improved to help the wearer monitor the signs of anxiety, depression, and other mental health challenges that so many people face on a daily basis.

PROBLEM

How could smartwatches be improved to better monitor mental health biomarkers?

SOLUTION DESIGN DRIVING QUESTIONS

How is mental health data collected?

How can smartwatches reduce the anxiety of the wearer?

What are biomarkers for stress, anxiety, and depression?

What are solutions for early signs of mental health struggles?

RESOURCES

Mental Health By the Numbers | National Alliance on Mental Illness

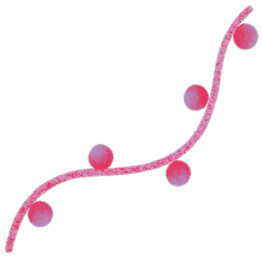
Mental health | World Health Organization

Mental Illness | National Institute of Mental Health

Biomarkers in Psychiatry: Concept, Definition, Types and Relevance to the Clinical Reality | PubMed Central | National Library of Medicine

The Search for Mental Health Biomarkers | Washington University ProSPER

Recognizing Warning Signs and How to Cope | Mental Health America



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INSPIRATION 2

Cancer, the second leading cause of death in the U.S. impacts millions. As with many diseases with both environmental and genetic components, risk evaluation and early detection are paramount to patient treatment and survival. Traditional cancer screenings can involve invasive procedures like biopsies and blood tests after detection of tumors through imaging. How could wearable technology be designed to help people monitor biomarkers for cancer from biofluids such as sweat or saliva?

PROBLEM

Can wearable technology be developed to collect data that can help with prevention or early detection of cancer?

SOLUTION DESIGN DRIVING QUESTIONS

What are the biomarkers for cancer?

What types of technology are currently being used to collect biomarkers for cancer?

How could biomarker data be collected through wearable technology?

What cancer types are most likely to be prevented or detected through biomarker data?

RESOURCES

Molecular Biomarkers in Cancer—PMC

Biomarker Tests and Cancer Treatment

The Use of Wearables in Clinical Trials During Cancer Treatment: Systematic Review—PMC

Current Update on Biomarkers for Detection of Cancer: Comprehensive Analysis—PMC

Biomarkers in Cancer

Challenges and recommendations for wearable devices in digital health: Data quality, interoperability, health equity, fairness—PMC

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