At Home Fetal Electrocardiogram/Heartrate Monitor for Congenital Heart Defect Diagnosis

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BRIEF DESCRIPTION

Congenital heart defects affect >1% of babies born in the United States. These defects originate early on in fetal development. Inventors at UC Irvine have developed a flexible medical device that allows at home fetal electrocardiogram (ECG) monitoring to diagnosis congenital heart defects during development.

FULL DESCRIPTION

Congenital heart defects (CHD) are among the most common birth defects and affect 1% of all babies born in the United States. If left untreated, they can lead to sudden death or heart failure. Currently, there is no technology that can offer CHD detection during pregnancy, except obvious cases. The traditional cardiotocography (CTG) is performed in the clinics shows only heartrate in a clinical setting, which cannot be used for CHD detection. It was showed CTG did not help reduce mortality rate. FDA also warned the danger of using repeating Doppler-based CTG.

The inventors at UC Irvine are developing a way to monitor the fetal ECG all throughout development with the robust detail needed to determine the health and development of the fetal heart. The inventors are using flexible electronics to design a wearable medical device that permits a pregnant mother to monitor the fetal ECG/heartrate in real time using a smartphone app in the daily life. With heart defects present as early as the 5th week of pregnancy, this non-invasive and unobtrusive device will allow doctor to accurately diagnosis heart defects and the patient and doctor to monitor the fetus remotely in a home setting. This innovative approach for monitoring the fetal cardiac health and development is not only easy to use and cost effective but the robust performance and analytic feature also pave the way to promote fetal and maternal healthcare as well as drive expectant moms toward a healthier/safer lifestyle.

SUGGESTED USES

·Fetal ECG/heartrate monitoring

·Expectant mother monitoring

·Adult heart rate monitoring

FEATURES/BENEFITS

- At home non-invasive fetal ECG/heartrate monitor that pairs with smartphone app for easy use
- High signal to noise ratio offers full-feature ECG acquisition with P waves, QRS and T waves, enabling diagnosis
- Rechargeable battery offers at least 24-hour monitoring window
- Machine learning-based algorithms allow high accuracy of fetal heart defect

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Medical**
  - Devices
  - Diagnostics
  - Disease: Cardiovascular and Circulatory System
  - Screening
- **Sensors & Instrumentation**
  - Medical

RELATED CASES

2019-378-0

STATE OF DEVELOPMENT

The fetal ECG prototype is awaiting validation. CHD detection via ECG has been done with the zebrafish model which is the ideal one to study genetic cardiac disease.Future plans involve demonstrating the device’s effectiveness in human patients and further optimizing the software components of the medical device to link with findings in zebrafish.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Cloud- enabled Wireless pH Monitoring in Laboratory Sample Vials
- Unobtrusive Fetal Heartrate Monitoring In The Daily Life

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