Non-invasive fetal electroencephalography (EEG)

Jose Cortes-Briones, PhD
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Every year, over 35,000 babies suffer from brain injury at birth in the U.S. alone

Fetal brain injury occurs during 9 of every 1,000 births & is a leading cause of worldwide lifelong disability due to low oxygen states at birth.

Children with brain injury during birth have 26 times the cost of lifetime medical care.

Brain injury from birth is the leading cause of childhood death and it caused by low oxygen (hypoxia).

How can we prevent fetal brain injury at birth?
Fetal heart rate monitoring is used in over 90% of births but has NOT decreased the rate of brain injury.

Heart rate changes can be misleading because they reflect downstream effects low oxygen status which causes brain injury.

Oxygenation of the fetus
But what if we could directly monitor the baby’s brain?

**THE SCIENCE**

Fetal neurologic activity can be evaluated by electroencephalography (EEG), providing information on sleep, conscious states, hypoxia & acidemia.

EEG provides an earlier detector of fetal low oxygen states before the heart rate changes.

**THE BARRIER**

However, prior fetal EEG required invasive monitoring, limited fetal positions & active labor.

This prior approach is not feasible for large-scale clinical use and as a result is not used anywhere.

**THE INNOVATION**

Advances in artificial intelligence & signal processing makes non-invasive fetal EEG possible.

We have developed a proprietary non-invasive method & algorithm to measure fetal EEG.
Non-invasive fetal EEG can directly measure the baby’s brain activity

- Our non-invasive fetal EEG uses AI to reconstruct the baby’s brain activity
- We can measure a **direct marker** of brain health
- **Non-invasive, clinically feasible**
- **Earlier detector** of brain injury compared to current methods

We have validated our method in a population of pregnant patients

Yale School of Medicine
Our solution has strong potential market

- **3.75 million births** per year in the US alone
- **4,600 clinic devices** 1 per 10 obstetricians
- **19,000 hospital devices** for use in labor

**Recurring sales**
- Device maintenance
- Annual software subscription
- Replaceable EEG electrodes
Our goals & milestones

- Development of algorithm
- NIH K12 award for $125,000
- Clinical validation in pregnant population
- Provisional patent filed

- Development of clinical nomogram
- Development of device prototype
- Begin prospective clinical trial

Jose Cortes-Briones, PhD
Assistant Professor, Psychiatry
NIH Trailblazer R21 Award
Background in electrical engineering

Emily Lee, MD
Instructor, Obstetrics, Gynecology and Reproductive Sciences Department
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NIH Women’s Reproductive Health Research K12 Award
Use of funds

- Formal validation study and publication of results
- EEG machines and ancillary materials
- Research team and staff
- Subject recruitment compensation
- Development and manufacturing of device prototype
- Ultimate goal for funding of a large, multi-center clinical trial

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