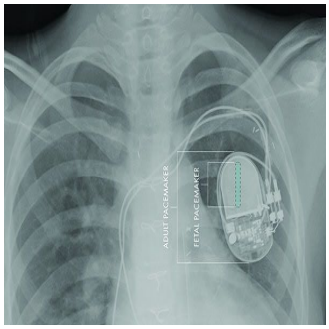
First Fully Implantable Micropacemaker for Foetal Use



A team of investigators at Children's Hospital Los Angeles and the University of Southern California have developed a fully implantable micropacemaker that is specifically designed for use in a foetus with complete heart block as reported in the journal *Heart Rhythm*.

The first of its kind, this micropacemaker has gone through preclinical testing and optimisation. The FDA has designated it as a Humanitarian Use Device. The team of investigators anticipate the first human use of the device in the near future.

To date, the available pacemaker devices have all been designed for adults and therefore there is a significant lack of effective treatment options for foetuses. In a healthy heart, electrical signals move from the upper to the lower chambers resulting in the contraction and pumping of blood. However, congenital heart block is a defect of the heart's electrical system that originates in the developing foetus. It slows the rate of the heart and impacts its ability to pump blood. Approximately 500 pregnancies in the US are affected by foetal heart block each year.

The condition can be diagnosed in utero but attempts to treat it with standard pacemakers have failed till now. The problem is that the adult device requires a small part to be implanted in the foetus while the rest of the device remains externalised. The design has uniformly failed because foetal movement causes the electrodes to become dislodged from the heart. However, this new micropacemaker is small enough to reside completely within the foetus and allows the foetus to move freely without dislodging the electrodes.

“We now have a pacemaker that can be implanted in utero, potentially without harm to the foetus or the mom,” said Ramen H. Chmait, MD, Director of the CHLA-USC Institute for Maternal-Fetal Health. “This novel device provides a real opportunity to prevent miscarriage and premature birth in babies affected with these abnormalities.”

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Source: Children's Hospital Los Angeles Saban Research Institute

Image Credit: Children's Hospital Los Angeles

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