

Researchers examine developing hearts in chickens to find solutions for human heart abnormalities (Video)

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When it is head versus heart, the heart comes first. The heart is the first organ to develop and is critical in supplying blood to the rest of the body. Yet, little is known about the complex processes that regulate the heartbeat.

By studying chickens' hearts, a University of Missouri researcher has identified certain proteins within the heart muscle that play an important regulatory role in embryonic heartbeat control. Understanding these components and how they interact will give researchers a better understanding of heart development and abnormalities in humans.

In the study, researchers examined embryonic chickens' hearts, which develop morphologically and functionally similarly to humans' hearts, and tested the electrical activity present in the cardiac muscle cells over a period of 24 hours. They found that changes in local proteins have important effects on embryonic heart beat control.

"Electrical activity in the heart appears in very early stages of development," said Luis Polo-Parada, assistant professor in the Department of Medical Pharmacology and Physiology in the MU School of Medicine and investigator in the Dalton Cardiovascular Research Center. "This study determined the role of the heart microenvironment in regulating electrical activity in cardiac cells that are required for normal cardiac function. Understanding exactly how a heart is made and how it begins to function will allow us to significantly improve therapies

for a wide range of cardiac anomalies, injuries and diseases such as hypertension, cardiac fibrosis, cardiac hypertrophy and congestive heart failure."

Cardiac function depends on appropriate timing of contraction in various regions of the heart. Fundamental to the control of the heart are the electrical signals that arise within the heart cells that initiate contraction of the heart muscle. The upper chambers of the heart, the atria, must contract before the lower chambers, the ventricles, to obtain a coordinated contraction that will propel the blood throughout the body. While scientists understand the gross actions of the electrical signals that drive cardiac contraction, little is known about changes in the local environment of the embryonic and adult heart cells that influence these contractions.

The study "Cardiac Cushions Modulate Action Potential Phenotype During Heart Development," has been accepted for publication in *Developmental Dynamics*.

Source: University of Missouri-Columbia

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