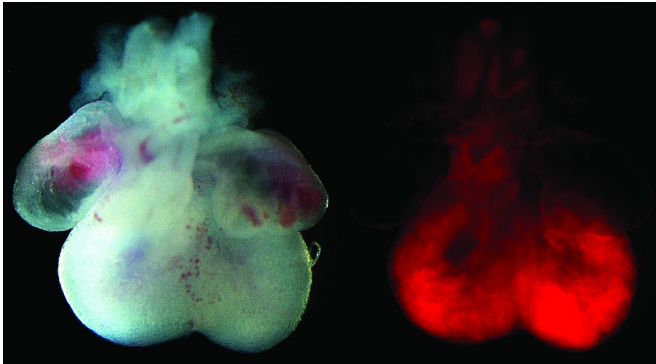


Researchers identify cells linked to the development of the heart's ventricular chambers

14 February 2017



The left image is of an embryonic mouse heart, showing the four chambered structure with atria at the top and ventricles at the bottom. The right image is the fluorescent lineage tracing reporter, showing that our newly discovered progenitor cell population contributes specifically to the ventricular chambers of the heart. Credit: Mount Sinai Health System

A population of cells in early development may give rise to the ventricular chambers of the heart, but not the atria, according to a study led by researchers from the Mindich Child Health and Development Institute at the Icahn School of Medicine at Mount Sinai and published today in *Nature Communications*.

Congenital heart defects are the most common type of birth defect, affecting 35,000 babies in the United States each year, according to the U.S. Department of Health and Human Services. Many of these defects originate as the heart chambers are forming. While much is known about the [development](#) of the heart, the formation of the four distinct chambers of the heart has lacked thorough understanding.

Using a model that traces cell lineage in mice,

investigators studied the protein-coding gene *Foxa2*, primarily associated with endoderm and ectoderm development during embryogenesis. They discovered a population of progenitor cells expressing *Foxa2* during [early development](#) that gave rise to cardiovascular cells of both the left and right ventricular chambers, but not the atria. Their research showed that atrial-ventricular segregation may occur long before the morphological establishment of differentiated cardiac structures.

"An in-depth understanding of the formation of the heart chambers will enable us to better comprehend the biology behind detrimental heart defects and how best to address them," said lead investigator Nicole Dubois, PhD, Assistant Professor in the Department of Cell, Developmental and Regenerative Biology at the Icahn School of Medicine at Mount Sinai. "In addition to informing our understanding of early heart development, we hope that these findings will also lead to new protocols for the generation of ventricular cardiomyocytes in cell culture that could potentially be used in therapeutic settings."

"There is a lot we still don't understand about this population, or the function of *Foxa2* during the formation of the heart, but we think these findings provide a powerful new system to answer some of the most relevant open questions about how early [heart](#) development occurs," said Evan Bardot, PhD student and first author of the *Nature Communications* study.

More information: *Nature Communications*, [DOI: 10.1038/NCOMMS14428](https://doi.org/10.1038/NCOMMS14428)

Provided by The Mount Sinai Hospital

APA citation: Researchers identify cells linked to the development of the heart's ventricular chambers (2017, February 14) retrieved 30 October 2022 from <https://medicalxpress.com/news/2017-02-cells-linked-heart-ventricular-chambers.html>

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