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# Human heart tissue harvesting

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Human Cell Atlas Method Development Community

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## ABSTRACT

This method describes harvesting of human heart tissues for spatial transcriptomics.

## DOI

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## PROTOCOL CITATION

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46645

## DISCLAIMER:

IRB approval is needed for human tissue collections.

### Prepare to dissect a heart 10m

- 1 Identify an acceptable human heart from autopsy, organ procurement, or transplantation. The heart may be fresh or <sup>5m</sup> may have previously been placed in formalin.
- 2 Prepare / obtain materials to dissect the heart. Razor blades, knives, forceps, and scissors are needed for cutting. <sup>10m</sup> A ruler and grid is needed for measurements. A camera is needed for documentation. Tissue cassettes are needed to collect heart tissues and can be labeled with a pencil. Formalin is needed as a fixative.

### Dissection Steps 14m

- 3 Clear the heart of any thrombosed blood and weigh the heart. Record the heart weight. Determine the shape of the <sup>3m</sup> heart and other external findings (globoid? normal? flabby? extreme adiposity? scarring? hemorrhages?) Orient the heart with the apex facing down and the base facing up.

- 4 Cut the heart ~2cm below the coronary sulcus, perpendicular to the apex/base axis. 2m

The steps 1, 3 and 4 may be performed just to allow fixation of the heart before complete dissection.

- 5 Cut a parallel section to the first heart cut ~4mm distal, creating a ring of ventricular tissue from the left and right ventricles. 3m

- 6 Open the right side of the heart by cutting the lateral wall from the right atrium into the right ventricle. Make a second cut from the right ventricle along the right ventricular outflow track through the pulmonary valve. This cut is on the anterior surface. 3m

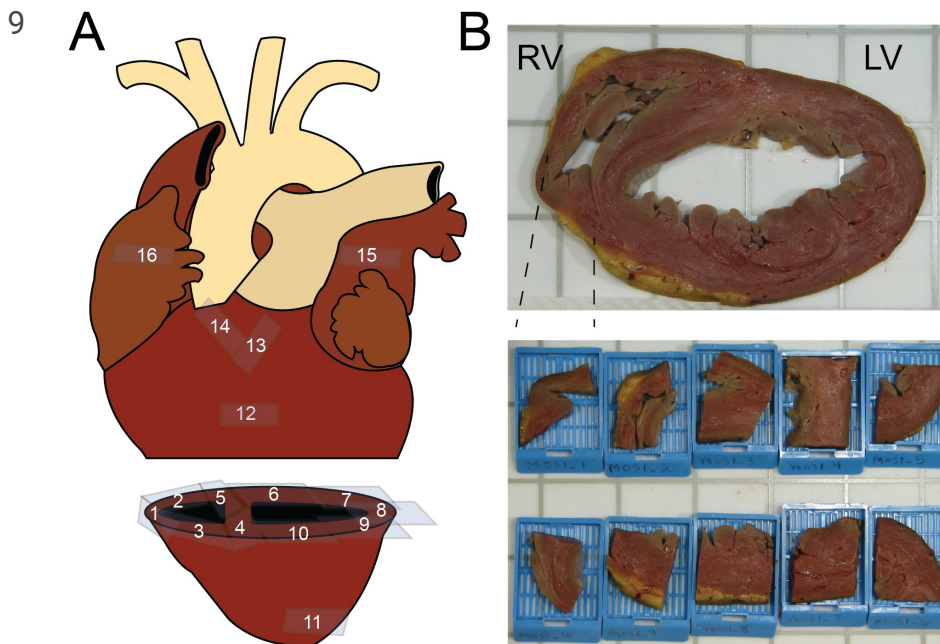
If necessary, the atrium can be opened by cutting from the superior to inferior vena cava and across through the auricle.

- 7 Open the left side of the heart by cutting the lateral wall from the left atrium into the left ventricle. Then cut open the left ventricular outflow track cutting from the left ventricle through the aortic valve. 3m

If necessary, the atrium can be opened by opening along the pulmonary veins and into the auricle.

- 8 Record left ventricle free wall, right ventricle free wall and septal thickness. Place the ventricle heart slide on the grid and take a photograph. Record the valve lengths and note any pathology. 8m

Collecting Tissues 22m



Sections to harvest

- 10 Take sections of the entire ventricular slice. These pieces should fit in ~10 cassettes. More cassettes (~12) may be<sup>10m</sup> needed for dilated cardiomyopathy or other diseases. Fewer may be needed in some smaller healthy hearts. Cassettes beyond #10 should be labeled 17+

Each section should be no more than 4mm in thickness and each piece should fit in a standard tissue cassette. This is true for all harvested tissues below as well.

- 11 Take a section perpendicular to the apex ~1cm above the apex of the left ventricle (section 11) 2m
- 12 Take a section of the septum ~2 cm above the ventricular slide, perpendicular to the left ventricle (section 12). 2m
- 13 Take a section of the right ventricular outflow track parallel to the cut that proceeded from the right ventricle into the<sup>2m</sup> pulmonary artery.
- 14 Take a section of the left ventricular outflow track parallel to the cut along the anterior surface of the left ventricular<sup>2m</sup> outflow track.
- 15 Take a random section of the left atrium that contains myocardium. 2m

16 Take a random section of the right atrium that contains myocardium. 2m

17 Photographs of all tissues in labeled cassettes should be obtained. 2m

Tissue Processing 1d 2h

18 Tissues should be fixed in formalin for ~24 hours before being further processed. Tissue should be made into formalin fixed paraffin embeded (FFPE) blocks and a H&E slide can be obtained. 1d

19 The H&E slide can be digitized while the FFPE blocks should be stored at -20 until further use. 2h