ESTIMATING THE CONDUCTIVITY TENSOR IN MOUSE EMBRYONIC HEART

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His-Purkinje System in embryonic hearts of 10 days old cx40-gfp mice was visualized in 3D using confocal microscope [1] with 10x dry objective (Fig. 1). CUBIC 2 protocol was applied for clearing the tissue. The local conductivity tensor of HPS, characterizing both the density and directionality of the system was estimated by following procedure. The images were segmented by thresholding difference of Gaussians of the original image. The binary image was skeletonized. The conductivity tensor was estimated using the heat kernel of the skeleton. The tensor was visualized in Amira 6.2 (FEI) together with volume rendering of trabeculation in left ventricle (Fig. 2). The anisotropy and the conductivity is visualize by the shape and size of the ellipsoids, respectively, the color corresponds to the fractional anisotropy.

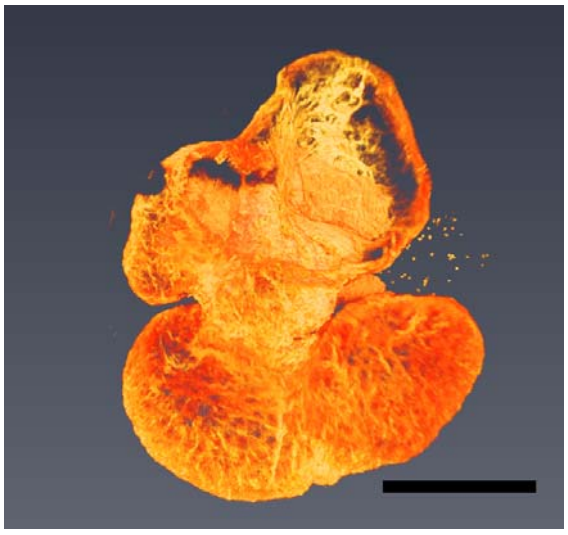

Figure 1. Mouse embryo heart, montage of confocal images, posterior view. Scale bar 500 μm.

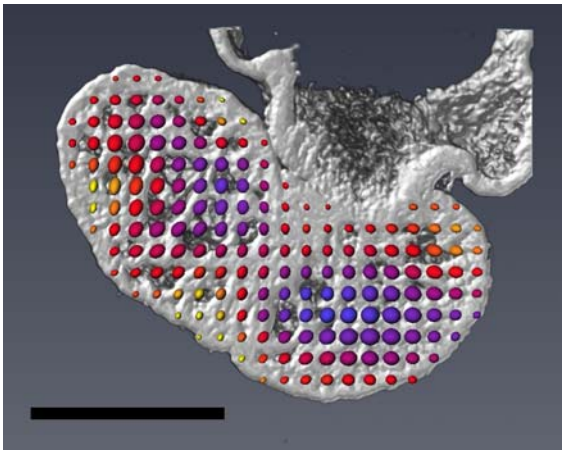

Figure 2. Left ventricle of embryonic heart, volume rendering and local conductivity tensor. Scale bar 500 μm.

Anisotropic character of trabeculation was visible especially in the left ventricle.

[1] H. Kolesová, M. Čapek, B. Radochová, J. Janáček, D.Sedmera, "Comparison of different tissue clearing methods and 3D imaging techniques for visualization of GFP-expressing mouse embryos and embryonic hearts," *Histochemistry and Cell Biology*, **146**, 141-52 (2016).

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