

Abstract Submitted
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Elastic Wave Propagation in a Mechanical Bidomain Model of Cardiac Tissue¹ STEFFAN PUWAL, BRADLEY ROTH, Oakland University — Cardiac tissue deforms under an applied stress, permitting elastic shear waves to propagate through the heart. Traditionally, this behavior has been modeled with a monodomain approach, in which the mechanical properties of the intracellular and extracellular spaces are averaged together. We consider a mechanical bidomain model of cardiac tissue, in which the intracellular and extracellular spaces are considered individually with the two spaces coupled by a spring constant. We find two normal modes of shear wave propagation: one in which the intracellular and extracellular spaces oscillate together (the monodomain mode), and the other in which they oscillate in opposition (the bidomain mode). These two modes have very different dispersion relationships, where in the bidomain mode the frequency depends on the spring constant, whereas in the monodomain mode it does not.

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Bradley Roth
Oakland University

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