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Elizabeth M Cherry* (elizabeth.cherry@rit.edu). *Contribution of the Purkinje network to wave propagation in the canine ventricle: Insights from a combined electrophysiological-anatomical model.*

The heart includes a specialized conduction system that ensures the necessary activation sequence and timing of the ventricles to produce an effective contraction. The role of this system, called the Purkinje network, during ventricular tachyarrhythmias remains unclear. To study how the Purkinje network interacts with ventricular muscle, we developed a combined electrophysiology-structural model of the canine Purkinje network based on microelectrode recordings and a digitized reconstruction of the Purkinje system. Using our combined model, we found that two different results could occur: the long-range connections provided by the Purkinje network could depolarize the tissue more quickly, thereby promoting arrhythmia termination, but if termination did not occur, the Purkinje system could increase the dispersion of refractoriness in the tissue, thereby sustaining the arrhythmia. The different behaviors result from the two competing effects contributed by the Purkinje network: effective reduction in tissue size and increased spatial heterogeneity. (Received July 09, 2012)