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DEVELOPMENT OF A MATHEMATICAL MODEL FOR WHOLE RABBIT HEART

In this talk, I shall report the progress of our long-lasting effort to develop a mathematical model for simulating the electro-physiology of whole heart for the rabbit. The anatomical structure of the heart was reconstructed by DT-MRI scan with a spatial resolution of 200 micro-meter. A novel family of single cell models have been developed for simulating the electrical action potentials for 16 distinctive cell types from regions of the sinoatrial node, the atria, the AV node, Purkinje fibre, left and right ventricles. These single cell models were incorporated into the 3D anatomical structure of the heart to simulate the initiation and conduction of excitation waves across the whole heart, from which EEC was extracted. The model was validated by quantitatively compare the characteristics of simulated ECG with experimental recordings.