This is the readme.html for the model associated with the paper shown below:

Bueno-Orovio A, Cherry EM, Fenton FH. Minimal model for human ventricular action potentials in tissue. J Theor Biol 2008;253(3):544-560.

Abstract

Modeling the dynamics of wave propagation in human ventricular tissue and studying wave stability require models that reproduce realistic characteristics in tissue. We present a minimal ventricular (MV) human model that is designed to reproduce important tissue-level characteristics of epicardial, endocardial and midmyocardial cells, including action potential (AP) amplitudes and morphologies, upstroke velocities, steady-state action potential duration (APD) and conduction velocity (CV) restitution curves, minimum APD, and minimum diastolic interval. The model is then compared with three previously published human ventricular cell models, the Priebe and Beuckelmann (PB), the Ten Tusscher-Noble-Noble-Panfilov (TNNP), and the Iyer-Mazhari-Winslow (IMW). For the first time, the stability of reentrant waves for all four models is analyzed, and quantitative comparisons are made among the models in single cells and in tissue. The PB, TNNP, and IMW models exhibit quantitative differences in APD and CV rate adaptation, as well as completely different reentrant wave dynamics of quasi-breakup, stability, and breakup, respectively. All the models have dominant frequencies comparable to clinical values except for the IMW model, which has a large range of frequencies extending beyond the clinical range for both ventricular tachycardia (VT) and ventricular fibrillation (VF). The TNNP and IMW models possess a large degree of short-term memory and we show for the first time the existence of memory in CV restitution. The MV model also can be fitted to reproduce the dynamics of other models and is computationally more efficient: the times required to simulate the MV, TNNP, PB and IMW models follow the ratio 1:31:50:8084.

To run the model:

XPP: start with the command

xpp bueno.ode

Mouse click on Initials, and then (G)o.

This makes a trace that closely resembles the one demonstrated in the paper:

一張含有 文字, 螢幕擷取畫面, 平行, 行 的圖片

自動產生的描述

Regarding the xpp program, developed by Bard Ermentrout, you can find more information of how to obtain and use it on his website: <http://www.pitt.edu/~phase/>. Bard Ermentrout is the creator of XPP.

These model files were developed and submitted by:

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