

ELECTROPHYSIOLOGICAL HETEROGENEITY IN POPULATIONS OF VENTRICULAR CARDIOMYOCYTES AND THE CONSEQUENCES FOR THE ACTION POTENTIAL RESPONSE TO SPECIFIC ION CHANNEL INHIBITION

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Studies on ventricular myocytes isolated from rabbit hearts suggests that single myocytes from the same region of a heart show highly variable electrophysiology and variable response to ion-channel blocking drugs. In-silico modelling of the electrophysiology of populations of cells suggests that the underlying cause is an even higher cell-to-cell variation in expression of ion-channels. This work suggests that action potentials occur because the relative expression of ion channels (rather than absolute) is regulated. Therefore, predisposition to arrhythmias from genetic or environmental causes may be due to disrupted pattern of co-expression. This work indicates alternative strategies to treat dysfunction, namely manipulations of the activities of ion channel activities in a network to restore the normal pattern of co-expression.