Cardiac cells in vitro -contraction and intracellular Ca dynamics-

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To investigate the relationship between contraction and intracellular Ca dynamics of cadiac cells, we tried simultaneous recording of intracellular Ca transients and spontaneous electrical activity in rat cardiomyocytes cultured on microelectrode arrays (MEAs) with 64 embedded electrodes. The MEA method is one of the promising tools to visualize network activity-patterns. We used the 2 or 3 days old Wistar rat cardiomyocytes and incubeted them in a CO_2 incubator at 37℃.To record intracellular Ca dynamics, we used fluo-4 as the indicator. The wavelength of excitation light source was 490nm. We recorded the serial image of the fluorescence of cardiomyocytes at 250 x 250 pixels resolution, 10frame/s, by charge-coupled device camera. Action potentials were measured by 64 microelectrodes. Electrical signals were recorded by 25kHz. In cardiomyocytes at 3DIV or later, synchronized electrical activity and Ca transients were observed, which suggested strong relationship between electrical activity and intracellular Ca dynamics.

Keywords: Microelectrode arrays, intracellular calcium, cultured cardiomyocyte, Japan

(notes：This is one of the presentations of the session “Human Science Integration and its Synthetic Research Methodology”. I hope you will take good care of this.)