Supplementary information

Analysis of time-course drug response in rat cardiomyocyte cultured on a pattern of islands.

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This document contains the following supplementary information for:

1) Maintaining the SECM system environment.
2) Beating fluctuations induced by ATP or PBS(-) stimulations.
3) Motion change of cardiomyocytes in adjacent islands.
4) Beating of cardiomyocytes with astemizole or control solution stimulations.

1) Maintaining the SECM system environment.

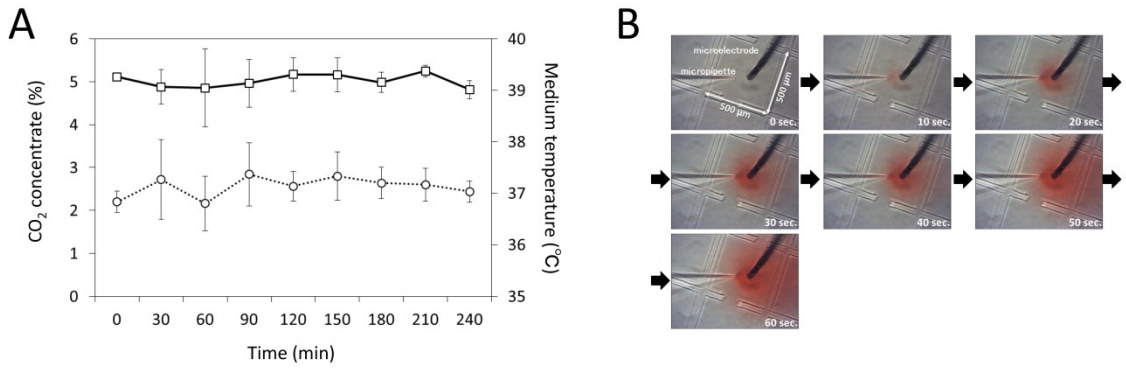
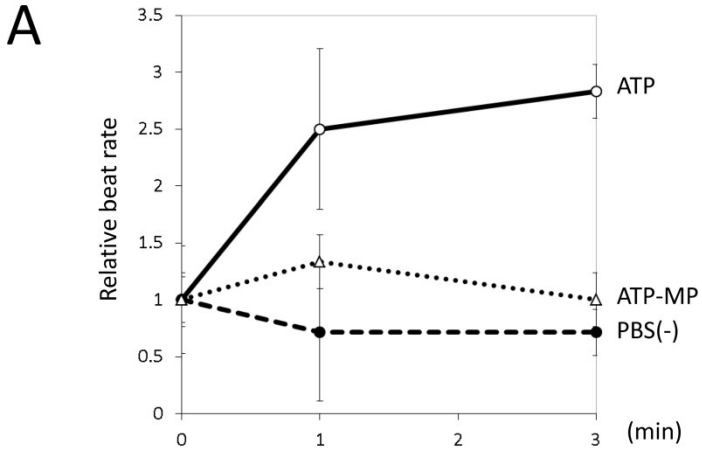
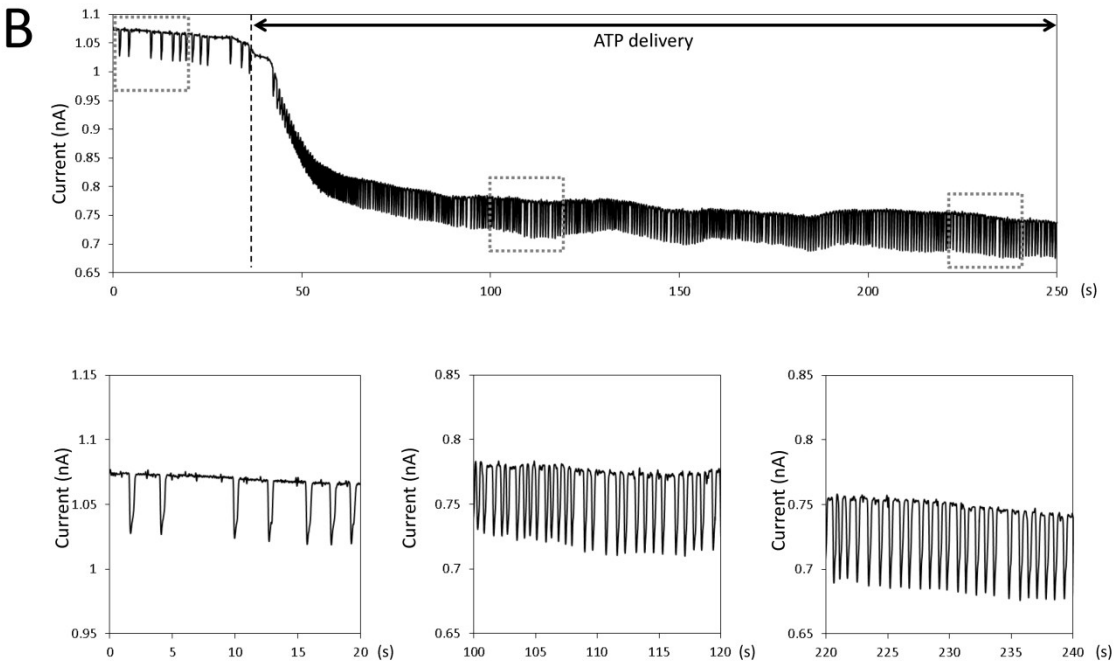


Fig. S1

(A) Time course of CO_2 concentration and medium temperature. Solid line indicates CO_2 concentration and dotted line indicates medium temperature. Medium temperature was measured using a probe thermometer that was inserted into the medium directly. (B) Diffusing images of drug solution that was locally delivered. To visualize movement of the drug solution, colored water was delivered and observed using a microscope.

2) Beating fluctuations induced by ATP or PBS(-) stimulations.





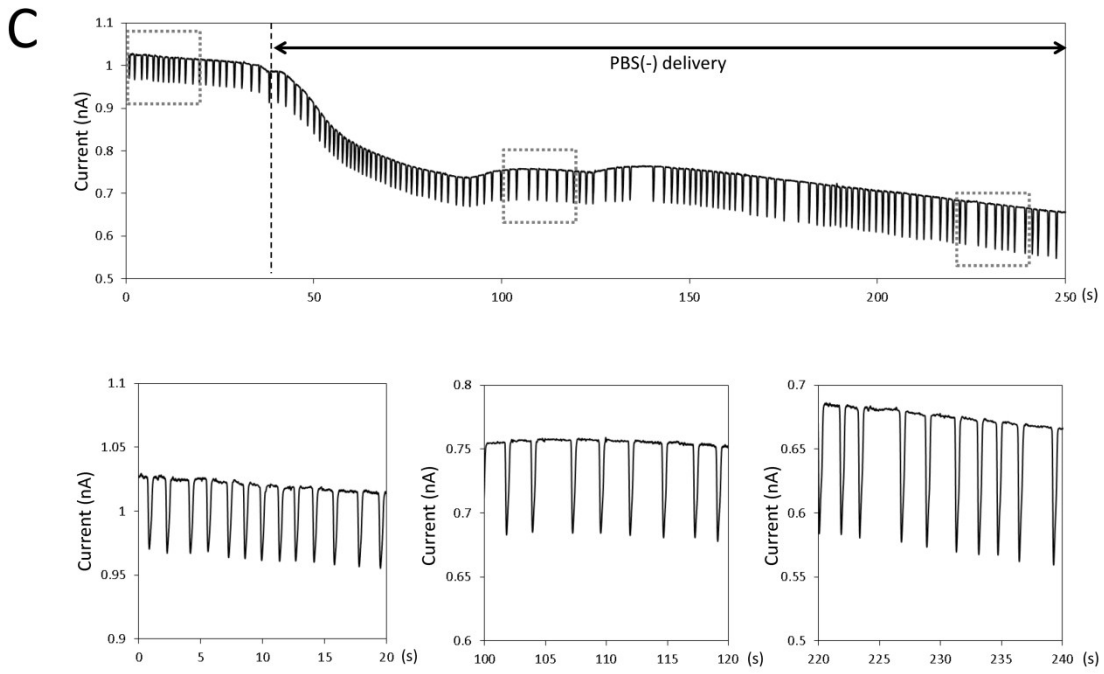


Fig. S2

(A) Time-course of beat rates after stimulation with ATP or PBS(-). ATP or PBS(-) solutions were added to the entire medium (indicated with ATP or PBS(-)) or locally delivered using the MP (ATP-MP). The beat rates after ATP/PBS(-) stimulation (1 and 3 min) are indicated as relative values to the beat rates before ATP/PBS(-) stimulation (0 min). Time-course measurement of the cardiomyocyte beating after stimulation with ATP (B) or PBS(-) (C). Upper panel shows whole relative current data from 0 s to 250 s. Lower panels show extracted current data for 20 seconds from 0 s to 20 s, from 100 s to 120 s and from 220 s to 240 s respectively.

3) Motion change of cardiomyocytes in adjacent islands.

Fig. S3 (Movie)

Before (A), and after (B), adding ATP upstream (left) of the target island. Before (C), and after (D), adding ATP to the target side (upper) of the island. In (A), cardiomyocytes showed almost the same beating rate at each islands. In contrast, the beating rate was increased only in upstream (left) islands that were delivered ATP, whereas the beating rate was not changed in downstream (right) islands in (B). The same result was seen in (C) and (D).

4) Beating of cardiomyocytes with astemizole or control solution stimulations.

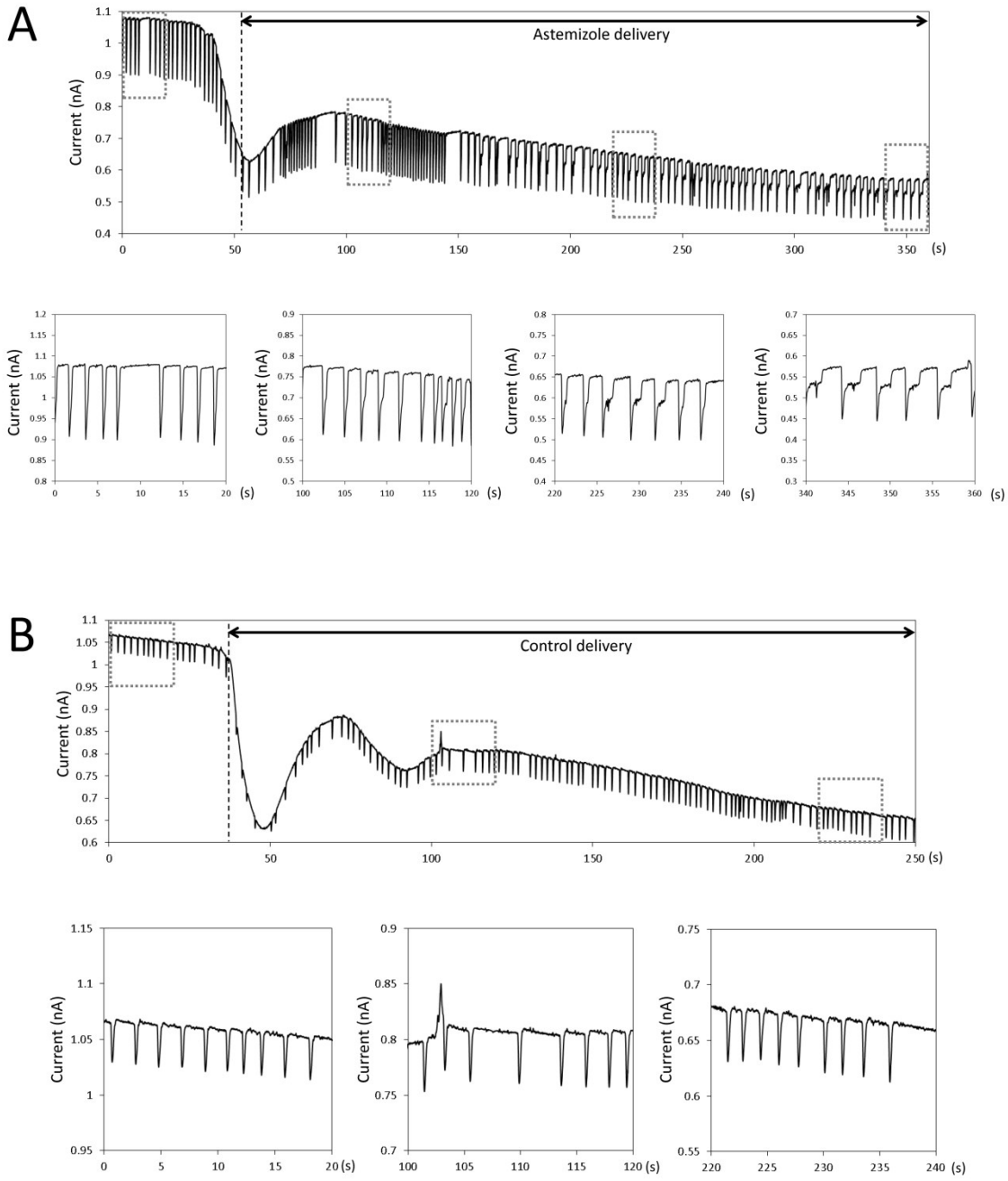


Fig. S4

Time-course measurement of cardiomyocyte beating with stimulation by astemizole (A) or a control solution (B). Upper panel shows the whole relative current data. Lower panels show extracted current data for 20 seconds from 0 s to 20 s, from 100 s to 120 s, from 220 s to 240 s and from 340 s to 360 s (only in A) respectively.