A novel probe for imaging of live human iPS cells

iPS cells can be cultured with monitoring of their quality

In recent years, development of a system to ensure a stable supply of quality controlled iPS cells in large quantities has become important in response to the high expectations held for regenerative medicine. Now, we have developed a highly sensitive lectin probe, rBC2LCN, for iPS cells. rBC2LCN binds to H-type 3 O-glycans on podocalyxin of iPS cells. rBC2LCN allows staining of live iPS cells. This probe shows no-toxicity and can be left in the culture medium, allowing the constant control of iPS cell quality during culture. Moreover, rBC2LCN was successfully used to separate iPS cells from mixed differentiated cells by flow cytometry, suggesting that rBC2LCN would facilitate safe regenerative medicine through removal of residual tumorigenic potential from cells for transplantation. We will evaluate whether transplanting cells treated with rBC2LCN are indeed non-tumorigenic after depletion of iPS cells, aiming at the practical use of the rBC2LCN-based technology in medical treatment.

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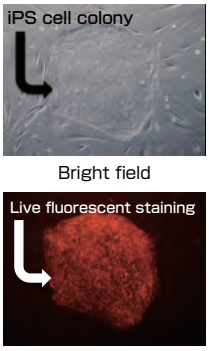
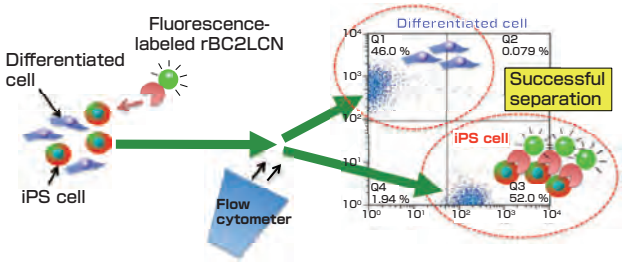


Optical microscope images of live iPS cells stained with rBC2LCN



Separation of iPS cells from differentiated cells using rBC2LCN

Development of handy fuel cell system

A power generator using commercially available LPG cartridges

The developed system employs microtubular solid oxide fuel cells (microtubular SOFCs), and a nanostructure-controlled electrode has enabled the direct use of highly portable general-purpose hydrocarbon fuels, including liquefied petroleum gas (LPG). A prototype handy fuel cell system with a DC 5 - 36 volt microtubular SOFC module was manufactured and demonstrated using a commercially available LPG cartridge. The system was able to drive a DC 5 volt USB device within two minutes. In addition, because only an LPG burner is used for start-up, no external power source is necessary. The rapid start-up and portability of the system mean that it is expected to find application as a power source in emergency and disaster situations and for outdoor use.

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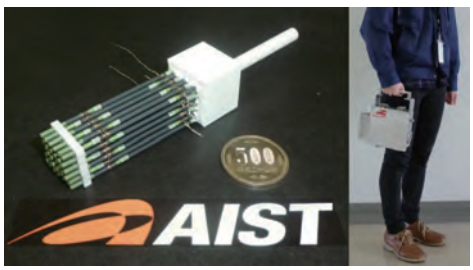
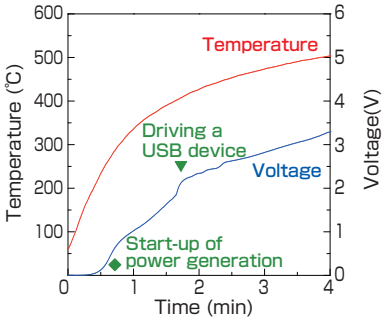


Microtubular SOFC module (DC 5 - 36 volts) (left) and the prototype of handy fuel cell system (right)



Rapid start-up operation with direct butane utilization (When a USB device is connected)