

« Cell fiber (fiber material containing living cells) »

<Summary of the invention>

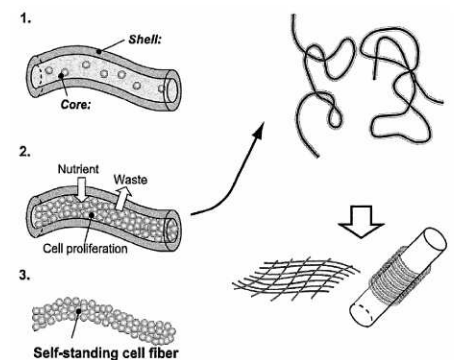
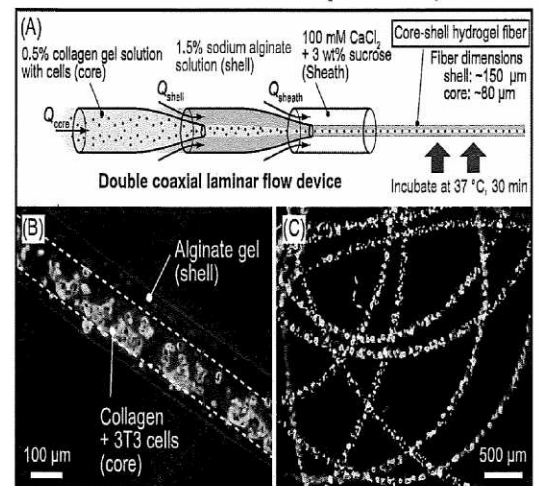
This invention is a cell fiber comprised of a long cylindrical outer shell filled with a gel (the core), which contains living cells and biogenic substances such as proteins within the core.

| Characteristics

- ◆ Because the outer shell is made of a rigid hydrogel, it can be handled with relatively sturdy objects such as tweezers. The fiber can be bundled or woven so that sheets and blocks can be made from the fiber. (By removing the outer shell from the fiber, the embedded cells can be exposed to air and used as a fibrous material on their own).
- ◆ By impregnating the gel of the core with a solution of collagen, biogenic substances remain functional and can be preserved for a long time.

| Examples

- ① epG2 cells (Human hepatic cancer cell line) were embedded in the core of the fiber and cultured; the core was completely filled with the cells after ten days. These inner cells adhered to one another so tightly that the fibrous form was still retained even after removing the outer shell of the alginate gel (by enzymatic treatment) and exposing the inner cells to air.
⇒ The inner cells formed a rigid structure.
- ② hen HepG2 cells and Min6 (pancreatic beta cell line) cells were embedded together in the core of the fiber, they formed a heterogeneous structure and continued to proliferate, even after removing the outer shell.
- ③ Primary cell culture was prepared from cerebral cortex of a rat brain and embedded in the core of the fiber. As a result, formation of many neurons and spontaneous Ca^{2+} oscillation among them were observed: this indicated the formation of a neural network.
⇒ Primary cells were successfully induced to differentiate.



| Applications

- ◆ Sheets or blocks composed of living cells
- ◆ Containers for preserving cells and/or proteins

By using a silicon tube as the outer shell, one can suck up and preserve cells in the tube and cut the tube to prepare a gel of proper length when using. Additives such as preservatives, pH regulators and buffer solutions can be added into the tube as needed.

<Inventor> Associate Professor Shoji Takeuchi et al., The University of Tokyo

<Notes> Patent Pending

<Contact>