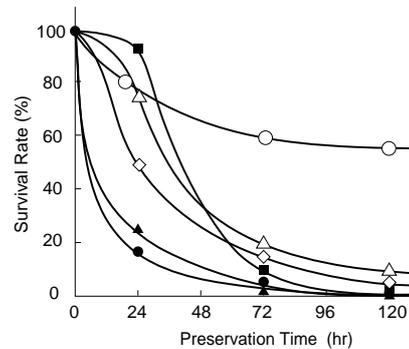# Lifetime elongation of cells by fish antifreeze protein
## Insulinoma cells can live for 5 days at 4 °C

We have developed a cell-preservation solution containing a macromolecule named antifreeze protein (AFP), which uniquely interacts with the membrane of a cell to prolong its lifetime. Even after 5-day hypothermic exposure at 4 °C, the survival rate of approximately 60 % was obtained for rat insulinoma cells (RIN-5F) stocked in a solution containing a flounder-derived type I AFP (AFPI). The 5-day preserved cells retained the ability to secrete insulin. In contrast, the survival rate of RIN-5F cells became zero in a solution without AFP after 3-day hypothermic preservation. We also developed a simple method of purifying massive amounts of the fish AFP, which utilizes the muscle homogenates of the mid-latitude fish as the source material. These results enable us to practically use the fish AFP for the short-term quality storage of the insulinoma cells collected from a donor without freezing. This will lead to an improvement of the success rate of diabetes mellitus treatment.

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**Time-dependence of the survival rate of rat insulinoma (RIN-5F) cells**
The cells were dissolved in Euro-Collins solution (●) as well as that containing AFPI (○), AFPII (△), AFGP (◇), treharose (■), and bovine serum albumin (▲).
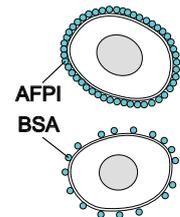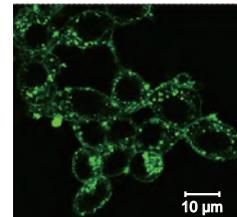
**Photomicroscope observation of insulinoma (RIN-5F) cells**
left: Confocal laser microscope image of the cells, whose membranes are brightened with fluorescent AFPI
right: AFPI can adsorb onto the whole membrane, while bovine serum albumin cannot.

# Software development kit 'SCCToolKit' for medical applications
## For quick transition of IT seeds to clinical applications

SCCToolKit is a software development kit to help build medical IT applications such as image processing of endoscope. Small Computings for Clinicals (SCC) is an activity to promote innovative technology and ideas into clinical research for proof of concept.

Main features of SCCToolKit are 1) support of HDTV video capture device, 2) fast image processing, 3) design guideline prohibiting use of keyboard and mouse. Typical applications of SCCToolKit include image fusion of echography and endoscope, and self-learning systems for surgical operations.

We verified that endoscopic applications built on a PC with SCCToolKit could perform as fast as commercial systems built upon custom hardware. We will collaborate with small businesses to assist their entry into medical application market.

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**Typical system configuration using SCCToolKit**