Department of Systems Medicine Presents

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場所:信濃町キャンパス
総合医科学研究棟1F ラウンジ

参加自由

哺乳類プライム型多能性幹細胞のWnt阻害による高効率樹立法の開発

Robust induction of primed pluripotency in mammals: Wnt inhibition is critical for derivation and maintenance of mouse epiblast stem cells

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In early mammalian embryos, there exist undifferentiated cells possessing ability to become various kinds of differentiated cells. These cells can be cultured in appropriate conditions and propagated indefinitely in vitro, and termed pluripotent stem cells (PSC). There are at least two kinds of PSCs in mammals, i.e. naïve and primed. Mouse embryonic stem cells (mESCs) are naïve PSC, isolated from pre-implantation embryos. Mouse epiblast stem cells (EpiSCs) are derived from epiblast of post-implantation embryos and classified as primed PSC. Interestingly, EpiSCs share many characteristics with human PSCs such as human ES cells (hESC) and human induced pluripotent stem cells (hiPSC). Because of enormous advantages of mice as an experimental system, EpiSCs should serve as a useful model for studying primed states of pluripotency. However, studies using the EpiSCs are still limited relative to mouse ESCs, partly due to technical difficulties in derivation and maintenance of EpiSCs.

Here we have devised a simple yet highly efficient protocol for EpiSC derivation and maintenance of homogenous, high-quality EpiSCs using inhibitor of Wnt signaling. Using this method, EpiSCs can be readily derived from any mouse strains tested. The EpiSCs derived by this protocol maintain homogenous, undifferentiated status, yet retain high differentiation potential. Unlike EpiSCs established by the original protocol, the new EpiSC lines requires the continued presence of the WNT inhibitor, suggesting intrinsic differences from the EpiSCs made by the original method. This new version of EpiSCs will provide clues to understand nature of primed states of mammalian pluripotent cells and open up a new avenue for stem cell applications.

We slightly modified the EpiSC culture condition to establish an efficient protocol for in vitro system of naïve-to-primed PSC conversion, which has been suffered from massive cell death occurring in this process. Our new protocol enables very efficient and reproducible conversion of naïve ESC to primed EpiSC-like cells for the first time.

＊セミナーは日本語で行います。

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