The 50th iCeMS SEMINAR

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演　題：**Control of Self-Renewal and Differentiation of Human Pluripotent Stem Cells by Small Molecules**

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The application of human pluripotent stem cells in regenerative medicine will require the propagation of large numbers of cells in the absence of animal products (xeno-free conditions). To date, most xeno-free culture systems require human feeder cells and/or highly complicated culture media. Particularly, to meet good manufacturing practice (GMP) standards, replacing such components with small molecules would provide significant advantages. Replacement with small molecules is contingent upon our understanding of the key signaling pathways involved in human pluripotent self-renewal. We performed by comparative microarray analysis of normal human embryonic stem cells (hESCs) to diploid hESC sub-lines that had been adapted to grow as single cells. Based on the analysis, we investigated several small molecules involved in the signaling cascades that enhance hESC survival and/or self-renewal. We found that a combination of Wnt ligands and a small molecule that modulates Wnt-mediated transcription could support hESC self-renewal and survival. Based on this discovery, we developed a novel xeno-free, feeder-free simple human pluripotent stem cell culture system consisting of a few defined growth factors: insulin, bFGF and Wnt3a, plus the small molecule Wnt modulator in DMEMIF-12 medium. Our culture conditions do not include complicated supplements, serum, serum replacement or albumin. In addition, we also developed a chemically-defined medium that could induce definitive endodermal cells from hESC efficiently.

主　催：京都大学 物質ー細胞統合システム拠点（iCeMS =アイセムス）
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