リプログラミング生物学(梶 圭介) Biology of Reprogramming (KAJI Keisuke)



KAJI Keisuke, Ph.D.
Professor
Biology of Reprogramming
MRC Centre for Regenerative Medicine
University of Edinburgh



E-mail address: Keisuke.kaji@ed.ac.uk

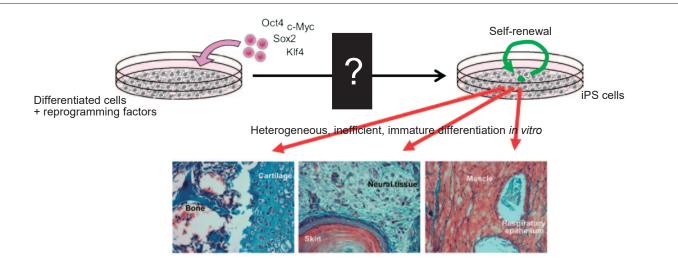
URL: http://www.crm.ed.ac.uk/research/group/biology-reprogramming

細胞運命コントロールのメカニズムを探る

2006年、分化した体細胞にたった4つの因子を導入することで人工多能性幹細胞 (iPS細胞)が作製できることが発見されました。iPS細胞は誰からも作成することが可能なうえ、様々な細胞に分化できるため、病気の発症に関わる基礎研究、創薬、薬剤毒性試験、再生医療など、多くの分野で活用されています。しかしながら、同じ条件を与えても100~1000個に1個程度の細胞しかiPS細胞にはならず、なぜ、少数の体細胞しかiPS細胞ならないのか、また、この4つの因子がどのように多能性を誘導するのか未だ解明されていません。私たちの研究室ではiPS細胞がどのようにできるのかを研究し、その知見を活かしiPS細胞以外にも医療に役立つ細胞を作製することを目指しています。

Molecular mechanisms of reprogramming

In 2006, a technology to generate induced pluripotent stem (iPS) cells from differentiated somatic cells using only 4 factors has been developed. iPS cells can be derived from any individuals and differentiate into various cell types, they have already been used for disease modelling, drug discovery, toxicology tests, and regenerative medicine. However, only 1 in 100-1,000 somatic cells can give rise to iPS cells and why the efficiency is so low, how the 4 factors induce pluripotency has not been elucidated. Our group aims to understand the molecular mechanism of the reprogramming, improve the technology and also generate fully functional other cell types useful for medicine, via cellular reprogramming based on the knowledge.



iPS cells are extremely useful cells that have a potential to make any cell types like embryonic stem (ES) cells. However, in reality, only a limited number of fully functional cell types can be generated from iPS/ES cells to date *in vitro*. Directing changes of cellular identity is still a challenge. We believe understanding molecular mechanisms of iPS cell generation can give us clues of how to manipulate cellular identity more efficiently and faithfully.