CDB SEMINAR

Qi-Long Ying

Department of Cell & Neurobiology, Keck School of Medicine
University of Southern California

Friday, December 11, 2009
11:00~12:00 C1F CDB Auditorium

Elucidating the mechanism underlying embryonic stem cell self-renewal

Summary

Germline competent embryonic stem (ES) cells have been established from mice and rats. Intriguingly, the conditions developed for the culture of mouse and rat ES cells do not yield authentic ES cells so far from any other species. Activation of STAT3 via the LIF receptor/gp130 signaling complex has been shown to mediate mouse ES cell self-renewal. However, addition of LIF is not sufficient to support rat ES cell self-renewal. Instead, rat ES cell self-renewal is sustained in the presence of small molecules that specifically inhibit glycogen synthase kinase 3 and mitogen activated protein kinase. We introduced a STAT3 transgene and an artificial gp130 chimeric receptor into rat ES cells. This allows us to modulate STAT3 activity within a wider range in ES cells. We have demonstrated that long-term self-renewal of rat ES cells can be sustained by increasing STAT3 activation, whereas LIF alone cannot. We hypothesize that the STAT3 activation level is critical for regulating ES cell self-renewal. Understanding the molecular mechanism underlying ES cell self-renewal may facilitate the development of new culture conditions that would allow us to derive ES cells from other species such as pigs and cows.

Host:
Hitoshi Niwa
Pluripotent Cell Studies, CDB
niwa@cdb.riken.jp
Tel:078-306-1930 (ext:1461)