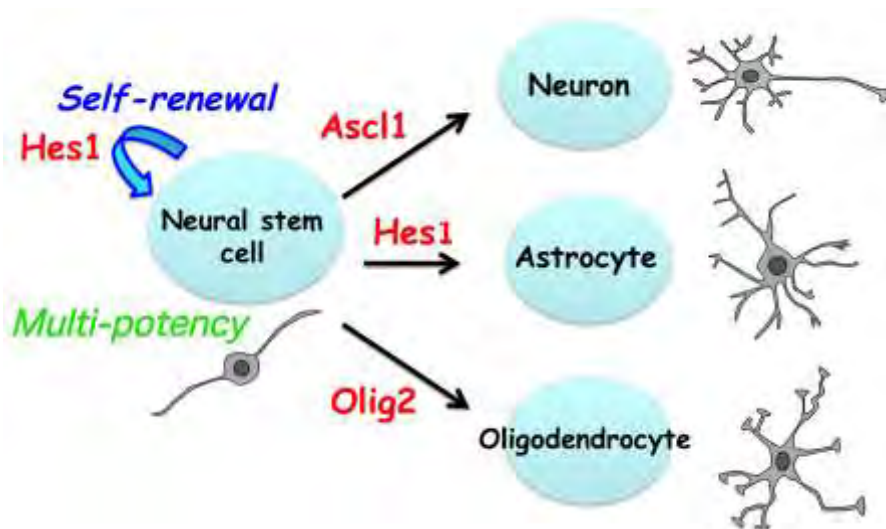


[FEATURED]

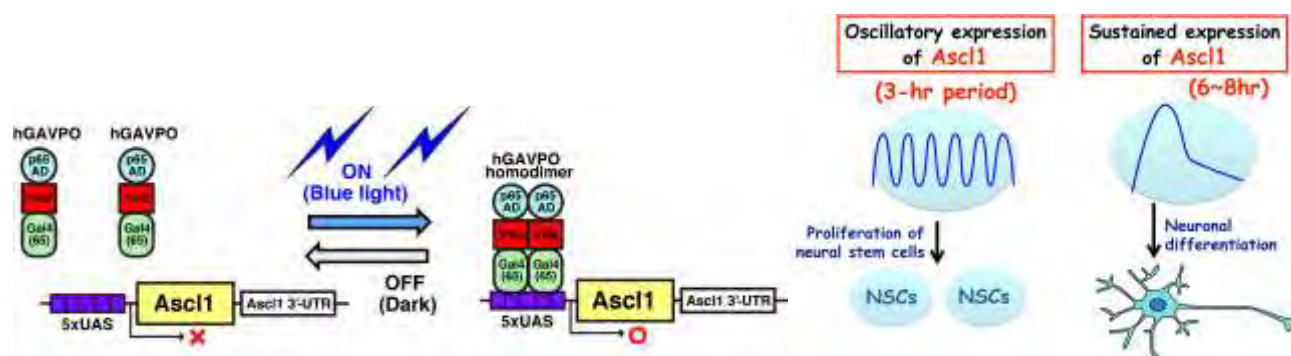
Oscillatory control of factors determining multipotency and fate in mouse neural progenitors

1 Nov 2013

The team led by the research director Ryoichiro Kageyama, professor at Kyoto University and one of its group leader Dr. Hiroshi Kori at Ochanomizu University have found by time-lapse imaging that the basic-helix-loop-helix transcription factors *Ascl1/Mash1*, *Hes1*, and *Olig2* are expressed in an oscillatory manner by mouse neural progenitor cells. The team also found that in each differentiation lineage, one of the factors becomes dominant.



To demonstrate the functional importance of oscillatory or sustained expression patterns of *Ascl1*, the team adopted the optogenetic gene expression system using the Gal4 DNA-binding domain and p65 activation domain fused with *Neurospora crassa* photoreceptor Vivid (GAVPO), and found that although sustained *Ascl1* expression promotes neuronal fate determination, oscillatory *Ascl1* expression maintains proliferating neural progenitor cells.



The paper was published in the online version of [Science on Oct 31, 2013](#). This is a major advance in understanding the significance of the oscillatory and sustained expression of proneural factors in regulation of self-renewal and fate choice of neural stem cells.

Also, their demonstration that the light-switchable gene expression system offers a new way to control the proliferation and differentiation of stem cells by changing the light exposure pattern rather than using different growth factors or chemicals showed its applicability to the regeneration technology.

[Journal Information]

Itaru Imayoshi, Akihiro Isomura, Yukiko Harima, Kyogo Kawaguchi, Hiroshi Kori, Hitoshi Miyachi, Takahiro Fujiwara, Fumiyoshi Ishidate, and Ryoichiro Kageyama, *Science*, Published online 31 October, 2013
[DOI:10.1126/science.1242366]

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Prof. Kageyama leads the CREST project titled as "Elucidation and control of dynamics of oscillatory gene expression in cell proliferation and differentiation" (Project duration: 1 Oct, 2012 - 31 Mar 2018).

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