



TOHOKU FORUM for CREATIVITY

Signals and factors controlling stem cell activity in the adult brain

François Guillemot

The Francis Crick Institute, Mill Hill laboratory, London, UK

francois.guillemot@crick.ac.uk

Neural stem cells can adopt diverse fates, including quiescence, self-renewal and neuronal or glial differentiation. The selection of appropriate stem cell fates is crucial for the normal growth of the embryonic brain and for the functional integrity of the mature brain.

The control of neural stem cells fates by extracellular signals has been thoroughly investigated. In contrast, little is known of the transcription factors that mediate the activity of these extrinsic signals and implement appropriate fate decisions.

Using high throughput genomic analysis and genetic approaches in neural stem cell cultures and in the embryonic and adult mouse brain in vivo, we have identified two transcription factors, ASCL1 and NFIX, which respectively promote neural stem cell activity and neural stem cell quiescence in the adult brain and in stem cell culture. We are currently investigating the regulation of the activity of these factors and the nature of the gene expression programmes that they activate.