



**eppendorf  
& Science**  
**PRIZE FOR  
NEUROBIOLOGY**

# 2004 Finalist

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## Qin Shen, Ph.D.

**Postdoctoral Fellow**  
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Dr. Qin Shen was born and raised in China. She earned her Bachelor's degree in Pharmacology from Shanghai Medical University in 1991. In 1996 she entered the Neuroscience graduate program at Albany Medical College in New York under the guidance of Dr. Sally Temple, who specializes in neural stem cell development. Her Ph.D. project, completed in 2001, focused on asymmetric cell division and the generation of cell diversity in the embryonic murine cerebral cortex. She is now a postdoctoral fellow working on mechanisms regulating neural stem cell self-renewal and cell-fate choices, including interactions between neural stem cells and endothelial niche cells.

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### Preventing aging in neural stem cells

As development progresses, neural stem cells change in their ability to self-renew and maintain multipotency. Interaction between stem cells and other components in the stem cell niche is important for maintaining stem cell properties and protecting them from harm. Recently, vascular involvement in neural stem cell niches has been suggested.

We show that endothelial cells, but not vascular smooth muscle cells, release soluble factors that dramatically stimulate neural stem cell self-renewal, inhibit their differentiation, and enhance their neuron production. Endothelial factors stimulate massive expansion of early embryonic cortical stem cells and are still able to generate pyramidal neurons normally made in the early embryo. Thus, by promoting symmetric rather than asymmetric cell division, the aging of neural stem cells can be halted. Endothelial co-culture stimulates neuroepithelial cell contact, activating Notch and Hes1 to promote self-renewal. These findings identify endothelial cells as a critical component of the neural stem cell niche.