This Week in The Journal

● Cellular/Molecular

Resisting Apoptosis with ΔNp73

Gregory S. Walsh, Nina Orike, David R. Kaplan, and Freda D. Miller
(see pages 9638–9647)

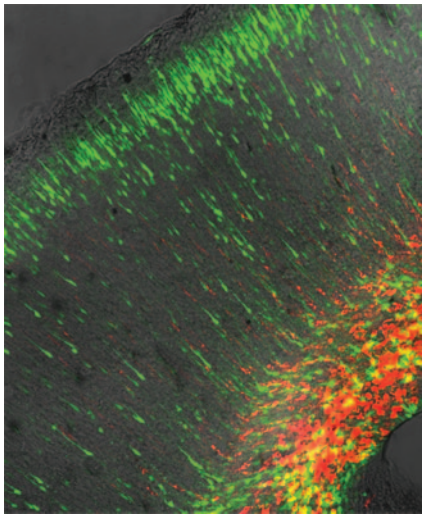
Young does not always equal hardy, at least in the case of peripheral neurons. Adult sensory neurons in culture do not require trophic factors for survival, and they can also withstand stimuli that send younger cells down the path to apoptosis. What is the cell-intrinsic shield that gives the adult neurons their relative invulnerability? Walsh et al. provide evidence that one essential component is ΔNp73, a dominant-inhibitory member of the p53 family. In their experiments, adult neurons better survived several apoptosis-promoting protocols, including withdrawal of NGF, inhibition of the phosphatidylinositol 3-kinase survival pathway, and activation of the p53-induced apoptosis pathway. Neurons lacking one allele for p73 were more susceptible to apoptotic stimuli in culture and to nerve injury *in vivo*. Exogenous expression of ΔNp73 also rescued survival. The authors propose that the expression level of ΔNp73 could determine susceptibility to cell death in multiple circumstances.

▲ Development/Plasticity/Repair

Filamin A Gets Neurons in Shape for Migration

Takashi Nagano, Soichi Morikubo, and Makoto Sato
(see pages 9648–9657)

The radial migration of neurons in the developing neocortex is a complex and highly orchestrated journey. Cortical malformations can arise from mutations in proteins involved in microtubular dynamics. Such studies have focused attention on the role of cytoskeletal proteins during migration from the subventricular zone to the cortical plate. For example, mutations in human filamin A, an actin-binding protein, cause periventricular heterotopias, which are misplaced accumulations of neurons. This week, Nagano et al. explore the role of filamin A in corticogenesis. They expressed enhanced green fluorescent protein (EGFP) or an EGFP-labeled mutant human filamin A in embryonic day 18 (E18) rat neocortical neurons using electroporation-mediated gene transfer. Neurons expressing only EGFP assumed a spindle shape and were radially oriented. However, neurons expressing the mutant filamin were ovoid and had decreased motility. Likewise, suppression of degradation of wild-type filamin increased the number of radially oriented, spindle-shaped cells. Thus it seems that filamin is important in getting migratory neurons in shape for their trip.



A montage photograph of the radial migration of neurons in the developing mouse neocortex. Neurons expressing a mutant filamin A (red) appear to be unable to enter the cortical plate, whereas many of the control neurons (green) have already migrated to the top of the cortical plate. See the article by Nagano et al. for details.

■ Behavioral/Systems/Cognitive

Modes of Visual Integration in the Pigeon Thalamus

Kristian Folta, Bettina Diekamp, and Onur Güntürkün
(see pages 9475–9485)

The lateralization of cortical functions such as language is a well known characteristic of humans as well as other vertebrates. This week Folta et al. use the highly lateralized visual system of the pigeon to examine asymmetries that arise from ascending sensory inputs (bottoms-up) as well as from top-down projections. Pigeons favor the right eye and left hemisphere for object discrimination. The authors recorded single units in the nucleus rotundus, a tectofugal visual processing center, while presenting visual stimuli to one or both eyes. They categorized "bottom-up" neurons as those with short-latency responses via retinotectorotundal inputs and "top-down" neurons as those with long-latency responses via telencephalotectorotundal inputs. Bottom-up processing displayed asymmetrical temporal features, possibly to facilitate rapid input to the right hemisphere and prolonged processing in the left. Top-down asymmetry, however, originated solely from the left hemisphere, suggesting its executive control over sensory and motor neurons.

♦ Neurobiology of Disease

Imaging Dopamine Function in the Primate

Bruce G. Jenkins, Rosario Sanchez-Pernaute, Anna-Liisa Brownell, Yin-Ching Iris Chen, and Ole Isacson
(see pages 9553–9560)

Magnetic resonance imaging (MRI) techniques are increasingly used to gain insights into not only the structure but also the function of neuronal circuits *in vivo*. This week Jenkins et al. extend a new application, pharmacologic MRI (phMRI), to examine functional dopamine (DA) circuitry in the normal and 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP)-lesioned, parkinsonian primate. During the imaging, they challenged the monkeys with amphetamine to increase synaptic DA release. In control monkeys, amphetamine caused relative cerebral blood volume changes in expected areas with a high density of DA receptors, but the authors also uncovered activity in a number of other regions. In parkinsonian primates, they saw some predictable changes in DA circuits as well as changes that had only been seen with postmortem histology, such as the preferential MPTP toxicity of A9 DA neurons with relative preservation of A10 neurons. phMRI appears to be a useful *in vivo* method to assess functional changes in circuits directly or indirectly affected by dopaminergic pathways.