how does the cell construct these distant structures? Ahmari *et al.* address this question by real-time imaging of hippocampal neurons in culture. By tagging the synaptic protein VAMP with green fluorescent protein, these authors could see that large assemblies of membranes, vesicles, and synaptic proteins were carried together in discrete packets down the axon and into the processes. As a synapse formed, these packets were diverted and localized. The preloaded vesicles then matured and were able to begin releasing transmitter within hours. Thus, partial fabrication of synaptic components in the cell body enables the cell to form synapses where needed, quickly and efficiently. — KK

Nature Neurosci. **3**, 445 (2000).

Biomechanical specialization relieves competitive pressure

PHYSICS

Not as Far to Go, But Longer to Get There

Shrinking the size of devices has been the method of choice in microelectronics (it has led to improvements in on-chip device densities with a commensurate increase in speed) and is a trend that is likely to continue. Fischetti and Laux, however, call into question the perceived improvements in device performance as dimensions become smaller. Their device modeling study shows that for transistors with conduction channels shorter than 40 nanometers and an oxide layer less than 2.5 nm, the close proximity of the conduction channel to the heavily doped source and drain contact regions is detrimental to electron transport in the channel; this effectively slows electron motion and leads to an overall reduction in device performance. — ISO

Appl. Phys. Lett. **76**, 2277 (2000).

EVOLUTIONARY ECOLOGY

A Tale of Two Salamanders

Evolutionary ecologists have theorized that two closely related animal species may be almost indistinguishable when they occupy different geographical areas, but show increased morphological or behavioral divergence in areas where their distributions overlap (sympatry). This phenomenon, called character displacement, is explained as a result of increased competitive pressure between sympatric species: competition tends to drive them to exploit different kinds of prey. Despite its theoretical appeal, however, character displacement has been demonstrated unequivocally in relatively few instances.

In a study of sympatric North American salamanders of the genus *Plethodon*, Adams and Rohlf apply new morphometric techniques to show how the jaw morphology and mechanics (the ratio of squamosal length to dentary length is proportional to closing force and inversely proportional to closing speed) of two salamander species have diverged in sympatry to allow capture of arthropod prey of different size and agility. Their results provide a solid example of character displacement and strengthen the case for the role it plays in the coexistence of species. — AMS

Proc. Natl. Acad. Sci. U.S.A. **97**, 4106 (2000).

HIGHLIGHTED IN *SCIENCE*'S SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT

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Sog Blocks Gbb, Supersog Blocks Gbb and Dpp

Two members of the bone morphogenetic protein (BMP) family of growth factors in *Drosophila* are encoded by the genes *decapentaplegic* (*dpp*) and *glass-bottom boat* (*gbb*). Yu *et al.* studied the effects of *short gastrulation* (*sog*) on wing development in adult flies and found that Sog abrogates signaling by the Gbb protein and not signaling by Dpp. Truncated forms of Sog, called Supersog, were observed in embryonic and pupal cells but not larval cells, suggesting that Sog is processed in vivo in a developmentally regulated manner. Expression of Supersog led to inhibition of both Dpp signaling and Gbb signaling. Although the metalloproteinase Tolloid (Tld) has been shown to degrade Sog to an inactive form, Yu *et al.* present evidence that Sog is proteolytically processed into Supersog by a complex of Tld and the Twisted Gastrulation (Tsg) protein. That is, whereas Tld alone degrades Sog, the subsequent expression of Tsg appears to modify Tld proteolytic activity, leading to the formation of Supersog. This may establish the gradient required to regulate Dpp activity and subsequent differentiation of the dorsal region. — JN

Development **127**, 2143 (2000).