IN BRIEF

NEUROMODULATION

A rapid switch in sympathetic neurotransmitter release properties mediated by the p75 receptor.

Yang, B. *et al. Nature Neurosci.* **5**, 539–545 (2002)

Neonatal sympathetic neurons that innervate cardiac myocytes in culture contain both an inhibitory neurotransmitter, acetylcholine, and an excitatory one, noradrenaline. Yang *et al.* show that brain-derived neurotrophic factor, acting through the p75 neurotrophin receptor, causes cultured sympathetic neurons to switch from excitatory to inhibitory transmission within a short space of time.

MOTOR SYSTEMS

Complex movements evoked by microstimulation of precentral cortex.

Graziano, M. S. A. *et al. Neuron* **34**, 841–851 (2002)

The authors stimulated discrete points of the motor and premotor cortices, and managed to elicit complex movement sequences that involved many joints. The effect of the stimulation at any given point was reproducible; it always led to the same final posture regardless of the direction of movement that was required to reach that position. Furthermore, postures that involved the upper limb formed a topographic map of hand positions around the body, providing evidence that motor and premotor areas contain an egocentric workspace map.

LEARNING AND MEMORY

The basolateral complex of the amygdala is necessary for acquisition but not expression of CS motivational value in appetitive Pavlovian second-order conditioning.

Setlow, B. *et al. Eur. J. Neurosci.* (in the press)

In Pavlovian conditioning, a rat can be taught to associate a conditioned stimulus (CS) with a food reward — this is known as first-order conditioning. In second-order conditioning, the initial CS is paired with a new CS in the absence of food, and the rat learns to expect food on presentation of the new CS. Here, the authors show that the basolateral complex of the amygdala is required for learning the motivational value of the initial CS, but not to maintain this information or to form the second-order association.

VISION

Aware or unaware: assessment of cortical blindness in four men and a monkey.

Stoerig, P. *et al. Cereb. Cortex* **12**, 565–574 (2002)

People with blindsight can see, but they are not consciously aware of it. Testing for conscious vision in humans requires them to say whether they saw a stimulus, so it is difficult to distinguish blindsight from residual conscious vision in animals. Here, Stoerig *et al.* trained a hemianopic monkey to indicate when she failed to detect a stimulus, and they ascertained that her blindness was due to loss of conscious vision. This constitutes the first evidence that blindsight can be modelled in primates.

NEUROLOGICAL DISORDERS

The α and β of folding

Many neurological disorders are characterized by the formation of abnormal aggregates in which proteins tend to adopt a β-sheet structure. This fact has led to the suspicion that β-sheet formation might be a general mechanism for the development of aggregates in conditions as diverse as Alzheimer's disease and transmissible spongiform encephalopathy. But new data from Sadqi *et al.*, published in *Biochemistry*, indicate that there is at least one important exception. They report that paired helical filaments (PHFs) — the main intraneuronal aggregate in Alzheimer's disease — have an α-helical conformation.

The tau protein is the main constituent of PHFs. Previous data had shown that tau lacks any regular structure in solution, and earlier attempts to determine the structure of PHFs grown *in vitro* or isolated from the brain found a similar lack of structural order. Sadqi *et al.* isolated PHFs directly from the brains of people with Alzheimer's disease, and set out to determine their structure by using a combination of Fourier transform infrared spectroscopy and far-ultraviolet circular dichroism. They found that PHFs are comprised of α-helices that, judging by their resistance to protease digestion and thermal denaturation, seem to be quite stable. Moreover, the authors found evidence that the α-helical configuration of PHFs is homogeneous. By obtaining circular-dichroism spectra during thermal denaturation, they found that PHFs melt as a homogeneous structure, with no sign of β-sheets even at the core of the aggregate.

As the tau protein has no regular structure in solution, the data imply that the α-helical configuration of PHFs emerges largely from protein–protein interactions. How this structural change takes place remains to be elucidated. But more significantly, the data of Sadqi *et al.* indicate that α-helix formation might also be a mechanism for the development of protein aggregates. It will be important to determine how widespread such a mechanism might be in other neurological disorders.

Juan Carlos López

References and links

ORIGINAL RESEARCH PAPER Sadqi, M. *et al.* α-Helix structure in Alzheimer's disease aggregates of tau-protein. *Biochemistry* **41**, 7150–7155 (2002)

WEB SITES

Encyclopedia of Life Sciences: http://www.els.net/

Alzheimer disease | circular dichroism: studies of proteins | Fourier transform infrared spectroscopy | protein structure classification