IN THE NEWS

A head start on autism

For more than 60 years it has been known that some people with autism have abnormally large heads. Now, a group from the University of California San Diego has described an aberrant pattern of head growth that might provide an early warning of the onset of this increasingly prevalent disorder.

Led by E. Courchesne, the team examined the medical records of normal children and infants with autism between the ages of 6 and 14 months. The head size of 60% of the patients was significantly above average, and the severity of their symptoms was positively correlated with head circumference. Interestingly, head size at birth was below average in the affected group, indicating that a growth spurt of unusual magnitude had occurred during their first year.

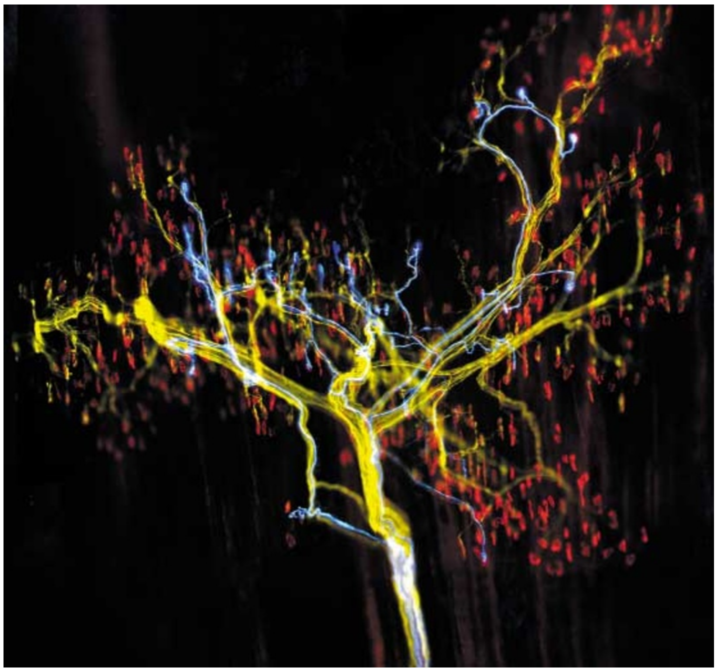
During development, steady brain growth allows synapses to form then be reinforced or eliminated, according to sensory and motor inputs. Courchesne told the *Seattle Post-Intelligencer* (16 July 2003) that rapid enlargement might inhibit "the guidance of experience and learning, [causing] the brain [to create] abnormal connections that make it very hard for autistic children to make sense of the world they live in".

As this pattern of head development can be detected long before the onset of behavioural symptoms, the already routine measurement of the head circumference of infants will yield an early warning to parents of those at risk. As the father of a child with autism, R. Rollens of the MIND Institute is all too aware that "it's better to know as early as possible that something might be wrong" (*Los Angeles Times*, USA, 16 July 2003).

Suzanne Farley

SYNAPTOGENESIS

A process of elimination



Two motor axons expressing different coloured fluorescent proteins (yellow and cyan). Post-synaptic receptor sites are labelled with Alexa-594 conjugated bungarotoxin (red). Reproduced, with permission, from *Nature* © Macmillan Magazines Ltd.

In mammals, the immature neuromuscular junction (NMJ) receives inputs from several motor neurons, but these are gradually whittled away during early postnatal life, so that each muscle fibre in the adult is innervated by a single motor neuron (although each motor neuron can still innervate many muscle fibres). What determines which input will escape elimination? Is the competition mediated by local factors at each NMJ, or by some global property of the motor neuron? Two new studies reported in *Nature* provide some answers to these questions.

Kasthuri and Lichtman generated transgenic mouse lines in which a fraction of motor neurons expressed different fluorescent proteins. They obtained mice in which a single forelimb motor neuron expressed cyan fluorescent protein, whereas another expressed yellow fluorescent protein. In the forelimb muscles of neonatal

ATTENTION

Faster than the eye can see

Visual attention is a demanding task for the brain, owing to the many factors that can affect our attentional capability. A recent paper reports that it is possible to dissociate two aspects of attention — its top–down control and the so-called 'attentional blink' — in people with mild cognitive impairment (MCI). This dissociation indicates that different neural substrates subserve these two processes.

Many studies have established that, when presented with complex visual stimuli, our attention to specific elements of the scene is influenced by 'automatic', stimulus-driven processes (which are referred to as bottom–up) and by task-dependent, goal-directed mechanisms (termed top–down). At the same time, much effort has gone into finding out how quickly attention can be directed at a stimulus, and how long it takes to disengage from it to attend to a different one. This effort has disclosed a phenomenon known as attentional blink; when we're required to identify two stimuli that are briefly presented in close succession, the first stimulus interferes with our ability to identify the second for a period of up to 500 milliseconds.

In the new paper, Perry and Hodges explored how top–down mechanisms interacted with the attentional blink by sequentially presenting two brief stimuli, and asking subjects to identify both of them, or to ignore one of them and identify the other. In the first case, the interference of the first stimulus with the identification of the second one constituted a measure of the attentional blink; in the second case, the ability to ignore the first stimulus provided a measure of top–down processing. They tested two groups of people — healthy subjects and people with MCI (the preclinical stage of Alzheimer's disease) — and found that, whereas the attentional blink was similar between the groups, top–down processing was impaired in people with MCI.

What are the neural systems that subserve these attentional processes? The prefrontal cortex has been implicated in top–down processing, and the authors propose that the attentional blink might depend on perceptual processes