

Biomedical Update:

von Economo neurons: a key to autism?

Biologist John Morgan Allman and colleagues speculate that autism involves abnormal development of cells called “von Economo neurons,” believed to facilitate quick intuitive assessment of complex situations.

Allman et al. say evidence indicates that the von Economo neurons, which are unique to humans and apes, relay output from the fronto-insular and anterior cingulate cortex to parts of the frontal and temporal cortex, “where fast intuitions are melded with slower, deliberative judgments.” These neurons, they suggest, “are a neuronal specialization that enables us to reduce complex social and cultural dimensions of decision-making into a single dimension that facilitates the rapid execution of decisions.”

Allman and colleagues note that unlike most cortical neurons, which arise well before birth, the von Economo neurons first appear in the 35th week of gestation and dramatically increase in number between birth and age four. The researchers suspect that the von Economo neurons fail to develop normally in individuals with autism spectrum disorders, which could explain why autistic individuals “may have extensive formal knowledge of social situations but lack the intuitions that serve to guide normal subjects through complex social interactions.”

Editor’s note: *It is interesting that the von Economo neurons develop not just before birth, but also during infancy and the toddler years when children’s brains are often subjected to multiple environmental insults including vaccine toxins.*

“Intuition and autism: a possible role for von Economo neurons,” J. M. Allman, K. K. Watson, N. A. Tetreault, and A. Y. Hakeem, *Trends in Cognitive Sciences*, July 4, 2005 (epub ahead of print). Address: John Morgan Allman, Division of Biology, MC 216-76, California Institute of Technology, Pasadena, CA 91125. See also: Abstract, James Arthur Lecture presented by John Morgan Allman, March 7, 2005. See <http://www.amnh.org/programs/lectures/jamesarthur>.

Immediate drug therapy doesn’t reduce long-term seizure risk

Doctors often prescribe anticonvulsant drugs after a first seizure occurs, but a recent study indicates that immediate drug treatment does not reduce the risk of future seizures.

Anthony Marson and colleagues conducted a randomized study of the effects of immediate versus deferred anticonvulsant

drug treatment in 1443 patients with single or infrequent seizures. In the short term, drug treatment delayed the time to the first recurrence of seizures and increased the likelihood of an immediate remission. However, the researchers report that between three and five years after patients were randomized, 76 percent of patients treated immediately and 77 percent of those in the deferred-treatment group were seizure-free. Sixty percent of the immediately-treated group were taking anticonvulsants, compared to 41 percent in the deferred-treatment group.

Moreover, the researchers report, patients receiving immediate treatment were more likely to experience at least one significant side effect, such as depression, dizziness, gastrointestinal upsets, or fatigue. Otherwise, the researchers say, there was no significant difference in quality of life between the two groups.

“Immediate versus deferred antiepileptic drug treatment for early epilepsy and single seizures: a randomised controlled trial,” A. Marson, A. Jacoby, A. Johnson, L. Kim, C. Gamble, and D. Chadwick, *The Lancet*, Vol. 365, No. 9476, June 28, 2005, 2007-13. Address: David Chadwick, Division of Neuroscience, University of Liverpool, Liverpool, UK.

Thimerosal damage to neurons identified

A new study offers insight into the mechanisms by which thimerosal—a vaccine preservative that is 50 percent mercury—causes damage to neurons.

Using neuroblastoma cells as a model for developing neurons, M. L. Humphrey and colleagues exposed the cells to thimerosal and report that “within two hours of thimerosal exposure to the human neuroblastoma cell line, morphological changes, including membrane alterations and cell shrinkage, were observed. Cell viability... showed a time- and concentration-dependent decrease in cell survival upon thimerosal exposure.” When the cells were exposed to thimerosal for 24 hours, a significant number underwent apoptosis, oncosis, or necrosis (different types of cell death). Analyzing the causes of this damage, the researchers say their findings indicate that thimerosal damages neuronal architecture and initiates mitochondria-mediated cell death.

“Mitochondrial mediated thimerosal-induced apoptosis in a human neuroblastoma cell line (SK-N-SH),” M. L. Humphrey, M. P. Cole, J. C. Pendergrass, and K. K. Kinningham, *Neurotoxicology*, Vol. 26, No. 3, June 2005, 407-16. Address: M. L. Humphrey, Department of Pharmacology, Joan C. Edwards School of Medicine, Marshall University, 1542 Spring Valley Drive, Huntington, WV 25704-9388.

Calcium, vitamin D reduce PMS symptoms

Parents of autistic girls whose behavior problems escalate before their periods may find supplemental calcium and vitamin D beneficial, according to a new study of nondisabled women with premenstrual syndrome (PMS).

Elizabeth Bertone-Johnson and colleagues analyzed data from the Nurses’ Health Study II, comparing 1,057 women who developed significant PMS symptoms over the ten-year course of the study to 1,968 women who did not experience PMS or experienced only minor symptoms.

The researchers evaluated the women’s diets, as well as their use of supplements or calcium-containing antacids. They found that women with the highest dietary intake of vitamin D were 41 percent less likely to develop significant PMS symptoms than those with the lowest intake, while those eating diets highest in calcium were 30 percent less likely to develop PMS symptoms than those with the diets lowest in calcium.

These findings are consistent with earlier research by Susan Thys-Jacobs and colleagues (see ARRI 12/3) who found that calcium supplements reduced symptoms by 50 percent in women with PMS, and that vitamin D supplements were helpful as well. Thys-Jacobs et al. speculated that a deficiency of calcium can lead to abnormal levels of parathyroid hormone, in turn affecting levels of estrogen and progesterone and causing PMS symptoms.

Bertone-Johnson and colleagues say that more research is needed to confirm their findings, but conclude, “Given that calcium and vitamin D may also reduce the risk of osteoporosis and some cancers, clinicians may consider recommending these nutrients even for younger women.”

Editor’s note: *As we have reported previously, supplements of calcium and cod liver oil, which contains both essential fatty acids and vitamin D, have proven helpful in autism. Also, as this study notes, both calcium and vitamin D can help protect against osteoporosis. Autistic individuals taking anticonvulsants are at high risk for this disorder.*

“Calcium and vitamin D intake and risk of incident premenstrual syndrome,” E. R. Bertone-Johnson, S. E. Hankinson, A. Bendich, S. R. Johnson, W. C. Willett, and J. E. Manson, *Archives of Internal Medicine*, Vol. 165, No. 11, June 13, 2005, 1246-52. Address: Elizabeth Bertone-Johnson, Department of Public Health, University of Massachusetts, Amherst, MA 01003-9304, ebertone@schoolph.umass.edu.