CRIME Times

Linking Brain Dysfunction to Disordered/Criminal/Psychopathic Behavior

Volume 11, Number 1, 2005

Homicidal men exhibit subtle indications of neurological defects

Homicidal men with antisocial personality disorder exhibit significantly more neurological "soft signs" than typical males, according to a recent study.

Neurological soft signs (NSS) are minor anomalies not attributable to specific brain damage, such as an abnormal blink reflex or difficulty in discriminating between blunt and sharp objects by touch. A high NSS score suggests the presence of a central nervous system defect caused by either genetic anomalies or environmental insults such as prenatal or perinatal trauma. High NSS scores are associated with an elevated risk for significant psychological problems.

In the current study, Nina Lindberg and colleagues compared 14 homicidal men, all diagnosed with antisocial personality disorder and referred for forensic psychiatric evaluation, to 10 healthy men and eight patients with schizophrenia. (Schizophrenics typically have elevated NSS scores.) None of the patients had overt brain abnormalities or a history of neurological disease.

The researchers report, "The NSS scores of antisocial offenders were significantly increased compared with those

continued on page 6

Early malnutrition linked to later aggression, hyperactivity

A poor diet in early life is a strong risk factor for aggression and hyperactivity in childhood and adolescence, a new study reports.

Jianghong Liu and colleagues compared 353 children who were malnourished at age 3 to a control group of about 1,200 children who did not show signs of malnutrition at this age. All of the children were participants in a long-term study conducted on the island of Mauritius, off the coast of Africa.

> Children identified by the researchers as malnourished at age 3 were more likely than other children to be aggressive or hyperactive at age 8, to exhibit externalizing behaviors at age 11, and to exhibit conduct disorder and hyperactivity at age 17.

Children were categorized as malnourished if they exhibited any of these signs:

- angular stomatitis (cracking of the lips and corners of the mouth, a sign of riboflavin and/or niacin deficiency).
- abnormal hair pigmentation (a common sign of protein malnutrition, particularly in Africa).
- sparse, thin hair (a sign of protein-energy malnutrition or overall malnutrition; also a possible sign of zinc and/or iron deficiency).
- anemia, a sign of iron deficiency.

Overall, 22.6 percent of the children in the study showed one or more signs of malnutrition at age 3. To determine if the degree of malnutrition was a factor, the researchers divided the subjects into groups based on the number of malnutrition signs the children exhibited.

Liu and colleagues analyzed behavioral data taken when the children reached the ages of 8, 11, and 17, and report that "the children with malnutrition signs at age 3 years were more aggressive or hyperactive at age 8 years, had more externalizing problems at age 11, and had greater conduct disorder and excessive motor activity at age 17." These findings remained true when the researchers controlled for psychosocial factors including parental education and employment status, mother's age and marital status, quality of housing, access to toys and books, number of siblings, and presence or absence of parental mental illness.

A "dose-response" relationship was seen in the tests performed at ages 8 and 17, with a higher number of malnutrition signs correlating with a greater degree of externalizing behavior. The researchers also found that at 8 and 11, low IQ mediated the link between malnutrition and behavior problems. This indicates, Liu et al. say, that "malnutrition predisposes children to a lower IQ, which in turn predisposes them to externalizing behavior problems." They note, however, that malnutrition was associated with externalizing behavior problems at age 17 even when they controlled for IQ.

Liu and colleagues note that the malnutrition-behavior link remained

continued on page 2

Preemies' intermittent apnea could lead to dopamine alterations, childhood ADHD

Up to 85 percent of premature babies experience brief periods of apnea (pauses in breathing). A new study suggests that the resulting drops in blood oxygen levels can cause long-lasting changes in the release of dopamine from a key brain region, contributing to attention deficit hyperactivity disorder (ADHD) in later life.

Glenda Keating and Michael Decker exposed newborn rats to either 20-second bursts of a low-oxygen gas, or, as a control, 20 seconds of compressed air. When the rats were older, the researchers analyzed their activity patterns and the levels of dopamine in their brains. They found that the rats experiencing bouts of reduced oxygen intake during the first few days of life were hyperactive later in life. These rats also exhibited a 50 percent increase in the level of dopamine contained in the striatum and a corresponding reduction in the release of dopamine, meaning that their brains were abnormally storing the neurotransmitter.

Previous research by Decker had already revealed the link between repetitive apnea and ADHD-like behavior in rats, but the new study is the first to link brief, repeated periods of apnea to long-lasting reductions in the release of dopamine within the striatum, a brain region involved in behavior, learning, and memory.

Their findings, Keating and Decker say, could help to explain why drugs that increase dopamine levels in the brain, including amphetamine-like drugs such as Ritalin and non-amphetamine drugs such as Wellbutrin, are effective for children with ADHD. "So far scientists haven't sorted out which neurotransmitters are responsible for this effect," Decker says, "but if that could be narrowed down to just dopamine, as suggested by our data, it would provide a basis for developing drugs without the potential addictive properties of existing therapies."

The researchers plan to investigate methods of protecting the dopamine system in at-risk fetuses or children, saying these could include non-invasive dietary changes in mothers or infants.

—

"Low blood oxygen levels in newborns may contribute to ADHD development," news release, Emory University, Oct. 24, 2004. Findings presented at the annual meeting of the Society for Neuroscience, San Diego, Oct. 24, 2004.

Early malnutrition linked to later aggression, hyperactivity

(continued from page 1)

strong at different ages, was detected by three different behavioral tests, and was true for both genders and for different ethnic groups included in the study. They note, however, that further research is needed to investigate whether the effects on behavior stemmed from transient or chronic malnutrition, and whether prenatal malnutrition played a role.

"We hypothesize that early malnutrition negatively affects brain growth and development," they conclude, "and that brain impairments predispose to antisocial and violent behavior by affecting cognitive functions." They cite scientific literature showing that zinc, protein, and iron deficiencies can impair brain development and predispose to aggression, as well as recent research showing that dietary improvements can lead to reductions in antisocial behavior in adult criminal offenders (see *Crime Times* Vol. 8, No. 3, 2002, page 1).

"Because nutrition is a malleable factor," they say, "it may be more practical and easier to prevent externalizing behavior through better early nutrition targeting at-risk populations than more complex and expensive psychosocial manipulations." Such measures, they say, may also need to target prenatal diet in order to be effective.

—

"Malnutrition at age 3 years and externalizing behavior problems at ages 8, 11, and 17 years," Jianghong Liu, Adrian Raine, Peter H. Venables, and Sarnoff A. Mednick, *American Journal of Psychiatry*, Vol. 161, November 2004, 2005-13. Address: Adrian Raine, Department of Psychology, University of Southern California, Los Angeles, CA 90089-1061, raine@usc.edu.

QUOTABLE

"[One] reason for optimism in the heightened status of nutrition as a developmental factor is the recognition that supplementation can buffer some of the detrimental outcomes associated with poverty and related environmental factors. Good nutrition contributes to the development of complex mental abilities and is associated with better developmental outcomes. For this reason it is very important to ensure adequate dietary intake even when there is less ability to improve other social and environmental conditions of children."

—"The Relationship Between Undernutrition and Behavioral Development in Children," report of the International Dietary Energy Consultative Group, 1995

Gene variant affects alcohol "high," familial alcoholism risk

People with a gene variant that enhances the brain's response to opioids appear to get a larger "kick" from alcohol than people without this variant, according to new research. In addition, these individuals are much more likely to have a family history of alcoholism.

Alcohol releases natural opium-like chemicals called opioids, which in turn influence the dopamine system. This system, says researcher Kent Hutchison, is involved in cravings and the desire to use alcohol or drugs. "Thus," he says, "it is alcohol's effects on endogenous [naturally occurring] opioids that act as the gateway through which alcohol may influence this system." He notes that children of alcoholics have lower levels of opioids called beta-endorphins than children of non-alcoholic parents, and that young adults with a family history of alcoholism show larger increases in beta-endorphin levels when they drink than peers without such a family history.

To further investigate the role of opioids in alcoholism, Hutchison and Lara Ray studied 20 male and 18 female college students who were moderate to heavy drinkers, dividing them into two groups. One group possessed one copy of the "G" allele (gene variant) of a gene encoding for mu-opioid receptors and one copy of the "A" allele. The other group had two copies of the "A" allele. The G allele causes receptors to bind three times more tightly to beta-endorphins, meaning that a nerve cell with the G allele is much more sensitive to these chemicals.

Hutchison and Ray administered intravenous doses of alcohol to the participants and queried them about their reactions. The researchers found that those with the G allele reported higher levels of intoxication, stimulation, sedation, and happiness when they drank than did those with two A alleles. In addition, they found that individuals with one G allele were nearly three times more likely than those with two A alleles to have family histories of alcoholism.

Hutchison et al. found that individuals with the G allele were nearly three times more likely than those with the A allele to have family histories of alcoholism.

In separate research, David Oslin and colleagues found that individuals with at least one G allele appear to respond better to treatment with naltrexone, a drug that blocks the effects of opioids, than those without this allele. This makes sense, say Hutchison and Ray, because "a medication that reduces feelings of euphoria after alcohol consumption may be more successful among individuals with a genetic predisposition to greater feelings of euphoria after consuming alcohol."

—

"A polymorphism of the mu-opioid receptor gene (OPRM1) and sensitivity to the effects of alcohol in humans," L. A. Ray and K. E. Hutchison, *Alcoholism: Clinical and Experimental Research*, Vol. 28, No. 12, December 2004, 1789-95. Address: Kent E. Hutchison, Department of Psychology, University of Colorado, Campus Box 345, Boulder, CO 80309-0345, KentH@psychology.colorado.edu.

—and—

"A genetic difference at the opiate receptor gene affects a person's response to alcohol," news release, *Alcoholism: Clinical and Experimental Research*, December 14, 2004.

WE'RE ON THE NET!

All current and past issues of *Crime Times* are posted online on our Web page at:
http://www.CrimeTimes.org
Four separate indexes are available so an article can be located by issue, subject, title, or author.

Although we can't respond to emails, we'd like to hear from you. Email us at:
crimetimes@sbcglobal.net

If you'd like to be placed on our emailing list, send your email address to us at **info@CrimeTimes.org.** We will send you an email when our web site is updated with each new issue.

HELP US SPREAD THE WORD!

If you belong to an association or society that includes advertisements in its conference programs, please let us know (CrimeT@aol.com). We are interested in reaching out to new readers in the fields of criminology, law enforcement and justice, medicine, psychiatry and psychology, social work, and education.

Iron deficiency puts children at high risk for attention deficit hyperactivity disorder

Low stores of iron may put children at increased risk for attention deficit hyperactivity disorder (ADHD), according to a new study.

Eric Konofal and colleagues evaluated 53 children and young adolescents with ADHD, as well as 27 non-ADHD children with mild learning disabilities who served as controls. All of the children were medication-free for at least two months prior to entering the study. The researchers measured the children's serum ferritin levels to determine their iron status, and used the Conners' Parent Rating Scale to measure how severe the symptoms of each ADHD subject were.

Konofal et al. report that serum ferritin levels were significantly lower in the ADHD group than in the controls. Overall, they say, "serum ferritin levels were abnormal in 84 percent of children with ADHD and 18 percent of controls." One-third of the ADHD children had iron levels in the extremely low range, compared to only 3 percent of the controls. Moreover, serum ferritin levels were inversely correlated with the severity of ADHD symptoms. The researchers say their data indicate that low iron stores may explain as much as 30 percent of ADHD severity.

Konofal and colleagues speculate that iron deficiency leads to inattentive and distractible behavior and to learning disabilities, "a finding consistent with the role of iron deficiency in cognitive deficits and mental retardation."

> One-third of children with ADHD had iron levels in the extremely low range, compared to only 3 percent of controls. Overall, iron levels were abnormal in more than 80 percent of the ADHD group.

"Because hemoglobin and hematocrit levels were normal," Konofal et al. say, "the low ferritin levels should be considered a specific and primary abnormality." They conclude that "if serum ferritin levels should prove to be decreased in cerebrospinal fluid as well, this would suggest that a brain iron deficiency may underlie the symptoms of ADHD."

Iron is a coenzyme needed for the synthesis of neurotransmitter dopamine, and iron deficiency alters the density and activity of dopamine receptors in animals. Abnormal dopamine function, in turn, is strongly linked to ADHD. Thus, the researchers hypothesize, low ferritin levels may contribute to ADHD by altering brain dopaminergic activity.

The researchers conclude that pediatricians should consider iron supplementation as a first-line treatment for children with both iron deficiency and ADHD symptoms. They note that children or adults with "restless leg syndrome" may be especially likely to have pathologically low iron stores, as iron deficiency is a known cause of this syndrome.

—

"Iron deficiency in children with attention-deficit/hyperactivity disorder," Eric Konofal, Michel Lecendreux, Isabelle Arnulf, and Marie-Christine Mouren, *Archives of Pediatric and Adolescent Medicine*, Vol. 158, December 2004, 1113-15. Address: Eric Konofal, Service de Psychopathologie de l'Enfant et de l'Adolescent, Hôpital Robert Debré, 48 Boulevard Serurier, 75020 Paris, France, eric.konofal@rdb.ap-hop-paris.fr.

Infants of high-DHA mothers display advanced attention skills during first two years

New research indicates that babies whose mothers eat diets high in the omega-3 fatty acid DHA (docosahexaenoic acid) develop attention skills much more quickly than babies of low-DHA mothers.

John Colombo and colleagues measured the blood DHA levels of 70 pregnant women at the time of delivery, and then assessed their infants at several intervals between 4 and 18 months of age. Infants from high-DHA mothers, the researchers say, were 2 months ahead of the other infants at 6 months of age. The low-DHA babies caught up in early attention skills by 8 months of age, but were behind in other, more advanced types of attention skills at 12 and 18 months. At this stage, the babies of high-DHA mothers were significantly less distractible, and better able to sustain their attention when playing with complex toys.

"The most striking thing we found," says Colombo, "was that infants from mothers who had high levels of DHA consistently showed more advanced forms of attention all the way out into the second year of life."

Modern diets are typically low in DHA (See *Crime Times* Volume 5, Number 1, 1999, page 1). This nutrient, which cannot be manufactured by the body, is necessary for

continued on page 6

Adolescent cigarette addiction: genetic makeup a factor

New evidence that genes can affect a person's vulnerability to addiction comes from a study of teenagers' smoking habits.

Jennifer O'Loughlin and colleagues collected DNA samples from 228 7th-grade students who previously or currently smoked. The students completed quarterly questionnaires that assessed their smoking patterns, as well as the cravings and withdrawal symptoms they experienced if they attempted to quit.

The researchers then determined whether different variants of a gene called CYP2A6, which determines how quickly nicotine is metabolized, affected the students' vulnerability to developing a dependence on nicotine. Some variants of this gene are inactive or exhibit reduced activity, resulting in slowed nicotine clearance and thus prolonging the brain's exposure to the substance and possibly resulting in a more intense response.

O'Loughlin and colleagues detected no difference between students with the fully-active and partially-active variants of the gene. However, they found that students with the completely inactive variants of CYP2A6 were three times as likely as other students to become dependent on cigarettes.

Interestingly, while their risk of becoming addicted was greater, students with the inactive gene variants smoked fewer cigarettes (approximately 13 per week) than either students with low-activity variants (17 per week) or those with high-activity variants (29 per week). This suggests, the researchers say, that the inactive gene variant boosts the effects of nicotine, making it more addictive but also creating longer-lasting effects in users.

O'Loughlin says, "We know that early signs of nicotine dependence are a key factor in young smokers maintaining their new habit and eventually becoming addicted to tobacco. This shows us why even a brief exposure to tobacco during adolescence can result in long-term addiction for some kids."

> Teens with the inactive variants of the CYP2A6 gene were three times as likely to become addicted to tobacco as adolescents who did not have this variant.

The findings of the study are in line with a large body of evidence indicating that genes significantly influence the use of, and dependence on, potentially addictive substances including cigarettes, drugs, and alcohol. (See related story on page 3.)

—

"Genetically decreased CYPA26 and the risk of tobacco dependence: a prospective study of novice smokers," J. O'Loughlin, G. Paradis, W. Kim, J. Difranza, G. Meshefedjian, E. McMillan-Davey, S. Wong, J. Hanley, and R. F. Tyndale, *Tobacco Control*, Vol. 13, No. 4, December 2004, 422-28. Address: Jennifer O'Loughlin, Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, 1020 Pine Avenue West, Montreal, Quebec, Canada H3A 1A3.

—and—

"Tobacco addiction a matter of genes for some teens, new Canadian Cancer Society research finds," news release, November 24, 2004.

Crime Times is interested in hearing from readers conducting research pertaining to biological influences on criminality and psychopathology. Reprints of research papers are appreciated.

Temporal lobe reductions seen in conduct disorder

A new study implicates temporal lobe abnormalities as a culprit in early-onset conduct disorder, which in turn is a strong risk factor for adult antisocial behavior.

Markus Kruesi and colleagues evaluated magnetic resonance imaging (MRI) scans performed in the early 1990s on 10 youths (ranging in age from 9 to 20) with early-onset, persistent conduct disorder and histories of attention deficit hyperactivity disorder. The researchers compared each subject to a control subject without any psychological disorder, matching the pairs for age, gender, and handedness.

Kruesi et al. report that "right temporal lobe and right temporal gray matter volumes were significantly reduced in subjects with conduct disorder compared with controls." Prefrontal volumes also were smaller than in controls, but this difference did not reach statistical significance. When the researchers controlled for the effects of substance abuse, the conduct-disordered subjects still showed significant reductions in right temporal gray matter volume.

The researchers say their findings are consistent with research indicating that lesions to the temporal lobes contribute to psychopathic or antisocial behavior. They cite one study of 18 violent adult offenders classified as psychopaths, which reported temporal lobe volume reductions of 20 percent. In addition, they note that low tonic heart rate, reduced electrodermal response to stimuli, and other signs of low arousal, which are frequently reported in antisocial adults, are also seen in patients with unilateral right temporal lesions.

continued on page 7

Early Ritalin use may cause lasting brain, behavior changes

A study of rats indicates that Ritalin (methylphenidate) can permanently alter the brain in ways that could put its users at risk for adult depression, leading the study's authors to caution against the overuse of this drug.

William Carlezon and colleagues exposed rats to twice-daily doses of Ritalin during a period equivalent to human development from age 4 to age 12. The researchers tested the behavior of the rats when they reached adulthood and found that compared to a control group receiving saline rather than Ritalin, the Ritalin-treated animals tended to "give up" quickly on a test measuring their ability to deal with stress. The Ritalin-exposed rats also were less interested in cocaine than normal lab rats—an indication of alterations in brain systems involving dopamine, a neurotransmitter involved in causing a pleasurable response to rewards.

> Carlezon and colleagues report that rats exposed to Ritalin during early development tended to "give up" quickly on a test measuring their ability to deal with stress.

The researchers note that Ritalin has a positive effect on the behavior of many children with attention deficit hyperactivity disorder. They voice concerns, however, over the large number of children taking the drug and the high rate of misdiagnosis of ADHD in children exhibiting normal exuberance and immaturity, "especially when considering health effects that can last through adulthood."

The researchers caution that their animal study does not prove that the same effects occur in humans, but they say that it is critical for researchers to investigate this possibility.

—

"New study shows early Ritalin may cause long-term effects on the brain," news release, American College of Neuropsychopharmacology. This study was reported at the ACN conference in San Juan, Puerto Rico in Dec. 2004.

—see also—

"Understanding the neurobiological consequences of early exposure to psychotropic drugs: linking behavior with molecules," *Neuropharmacology*, Vol. 47, Supplement 1, 2004, 47-60. Address: William Carlezon, Department of Psychiatry, Harvard Medical School and McLean Hospital, MRC 217, 115 Mill Street, Belmont, MA 02478, carlezon@mclean.harvard.edu.

High DHA levels linked to enhanced attention skills

(continued from page 4)

the development of the brain and eyes. Because the mercury in fish is a concern for pregnant women, nutritionist Barbara Levine suggests that they eat omega-3-fortified eggs or take algae-derived supplements.

—

"Maternal DHA and the development of attention in infancy and toddlerhood," J. Colombo, K. N. Kannass, D. J. Shaddy, S. Kunderthi, J. M. Maikranz, C. J. Anderson, O. M. Blaga, and S. E. Carlson, *Child Development*, Volume 75, No. 4, July-August 2004, 1254-67. Address: John Colombo, Schiefelbusch Institute for Lifespan Studies, University of Kansas, Lawrence, KS 66045, colombo@ku.edu.

—and—

"Pregnant? Omega-3 essential for baby's brain," Salynn Boyles, *WebMD Medical News*, July 16, 2004.

—and—

"Infants whose mothers have higher levels of an essential omega-3 fatty acid show more advanced cognitive development," news-medical.net, July 21, 2004.

Homicidal men show signs of neurological defects

(continued from page 1)

of the healthy controls, whereas no significant differences were observed between the scores of offenders and those of patients with schizophrenia." While all of the homicidal men were intoxicated when they committed their crimes, they were alcohol-free at the time of evaluation, and their results were not affected by alcohol withdrawal or detoxification.

Lindberg et al. say their findings are consistent with mounting evidence showing a link between aggressive behavior and brain dysfunction. They cite a similar study of children showing a correlation between NSS and both oppositional defiant disorder and conduct disorder, and a study which found an elevated prevalence of NSS in adult sociopaths. Adolescent boys with repetitive aggression also have been reported to display more abnormal "mirror movements," a neurological soft sign, than non-aggressive controls.

The researchers conclude, "It can be speculated that neurological soft signs indicate a nonspecific vulnerability factor in several psychiatric syndromes, which are further influenced by a variety of genetic and environmental components. One of these syndromes may be antisocial personality disorder with severe aggression."

—

"Neurological soft signs in homicidal men with antisocial personality disorder," Nina Lindberg, Pekka Tani, Jan-Henry Stenberg, Björn Appelberg, Tarja Porkka-Heiskanen, and Matti Virkkunen, *European Psychiatry*, Vol. 19, No. 7, November 2004, 433-37. Address: Nina Lindberg, Department of Physiology, Institute of Biomedicine, Biomedicum Helsinki, University of Helsinki, P.O. Box 63, Helsinki 00014, Finland.

RESEARCH IN BRIEF

Serotonin gene variant linked to extreme violence

A new study by researchers in Taiwan adds to evidence linking altered serotonin levels to violence.

Previous research has suggested that the risk for aggression is increased for individuals with a low-activity "short" (S) variant of a region of the serotonin transporter (5-HTTP) gene, which plays a critical role in regulating the reuptake of the neurotransmitter serotonin by nerve cells. In the new study, D. L. Liao and colleagues compared 135 extremely violent male criminals to controls and found that "the proportion of S-allele carriers was significantly higher in the criminal group than in the controls." Their data indicate, they say, that the serotonin transporter gene "may be implicated in the mechanisms underlying violent behaviors."

—

"Possible association between serotonin transporter promoter region polymorphism and extremely violent crime in Chinese males," D. L. Liao, C. J. Hong, H. L. Shih, and S. J. Tsai, *Neuropsychobiology*, Vol. 50, No. 4, 2004, 284-7. Address: D. L. Liao, Department of General Psychiatry, Pali Psychiatric Hospital, Central Taiwan Office, Taipei, Taiwan, Republic of China.

—§—

Early diet affects brain function

A report by Brazilian researchers adds to evidence (see page 1) that early malnutrition can permanently affect brain function.

J. M. Barreto-Medeiros and colleagues divided 64 rats into two groups: one nursed by well-fed mothers and a second nursed by malnourished mothers. After weaning, all of the rats received a good diet.

When the rats reached adulthood, the researchers injected half of them with fluoxetine (Prozac), which affects serotonin levels in the brain and normally results in reduced aggression in rats. The rats who were well-fed in early life reacted normally to the drug by exhibiting less aggression, but the rats who experienced malnutrition during infancy did not reduce their aggressive behavior. The researchers conclude, "These findings suggest that the serotonergic system was affected by malnutrition during the critical period of brain development, and [that these effects] persisted even after a long period of nutritional recovery."

—

"Malnutrition during brain growth spurt alters the effect of fluoxetine on aggressive behavior in adult rats," J. M. Barreto-Medeiros, E. G. Feitoza, K. Magalhaes, J. E. Cabral-Filho, F. M. Manhaes-De-Castro, C. M. De-Castro, and R. Manhaes-De-Castro, *Nutritional Neuroscience*, Vol. 7, No. 1, 2004, 49-52. Address: J. M. Barreto-Medeiros, Dept. de Nutricao, Universidade Federal de Pernambuco (UFPE), Cidade Universitaria, 50670-901, Recife, PE, Brazil.

QUOTABLE

"[A]pproximately 90 percent of the chemicals produced in the highest volumes lack publicly available data necessary for even the most crude toxicity screening…. The continuing use of these untested chemicals amounts to an uncontrolled chemistry experiment where humans, and particularly children, are the lab rats."

—Jeremiah Baumann, Director, Toxics and Environmental Health Program, The State Public Interest Research Groups (PIRGs), Washington, D.C., in "Pollution, Toxic Chemicals, and Mental Retardation: Framing a National Blueprint for Health Promotion and Disability Prevention," July 2003

Temporal lobe reductions found in conduct disorder

(continued from page 5)

They note, too, that reduced empathy—a hallmark of antisocial or psychopathic behavior—is a common finding in frontotemporal dementia with pathology limited to the right temporal lobe.

Noting that other studies have reported significant reductions in frontal lobe volume, while their own study found only non-significant prefrontal reductions, Kruesi et al. say this may be a result of the older MRI scanning technique used in their own study or the confounding effects of drug use by subjects in other research.

While Kruesi et al.'s conduct-disordered subjects typically had lower IQs than controls, the researchers say that in two matched pairs, the conduct-disordered subjects had equal or higher IQs and still exhibited reduced right temporal volume. They say, "This is consistent with the possibility that the relatively smaller right temporal volume in those at high risk for antisocial personality may be independent of IQ." They note that the one female in their study did not exhibit temporal lobe volume reductions in comparison to the female control, and thus their findings may not extend to females.

—

"Reduced temporal lobe volume in early onset conduct disorder," Markus J. P. Kruesi, Manuel F. Casanova, Glenn Mannheim, and Adrienne Johnson-Bilder, *Psychiatry Research: Neuroimaging*, Vol. 132, 2004, 1-11. Address: Markus Kruesi, Dept. of Psychiatry and Behavioral Sciences, Medical University of South Carolina, 67 President Street, P.O. Box 250861, Charleston, SC 29425, kruesi@musc.edu.

Changing your address?
Please let us know, so we can ensure that your issues of Crime Times continue to reach you!

PROFESSIONAL ADVISORY BOARD

QUOTABLE "There are now 71 brain imaging studies showing that murderers, psychopaths, and individuals with aggressive, antisocial personalities have poorer functioning in the prefrontal cortex—that part of the brain involved in regulating and controlling emotion and behaviour.

"More dramatically, we now know that the brains of criminals are physically different from non-criminals, showing an 11% reduction in the volume of grey matter (neurons) in the prefrontal cortex.

"Violent offenders just do not have the emergency brakes to stop their runaway aggressive behaviour.

"Literally speaking, bad brains lead to bad behaviour.... One of the reasons why we have repeatedly failed to stop crime is because we have systematically ignored the biological and genetic contributions to crime causation."

—Psychology professor and
Crime Times *Advisory Board Member*
Adrian Raine, in "Unlocking Crime:
The Biological Key," BBC News, December 2004

CRIME Times is published quarterly by the Wacker Foundation, a non-profit organization.

Editor: A. K. Blake
PMB 132, 1106 N. Gilbert Road, Suite 2 • Mesa, AZ 85203

Volume 11, Number 1
2005

The Wacker Foundation
CRIME Times
PMB 132
1106 North Gilbert Rd., Suite 2
Mesa, AZ 85203

Nonprofit
Organization
U.S. Postage
PAID
Phoenix, AZ
Permit #1645