

AGGRESSION, SUICIDE: ZEROING IN ON A CHEMICAL CULPRIT

It's been linked to suicidal tendencies, violence and aggression, depression, alcoholism, and impulsive behavior. It's not a drug, but a natural brain chemical-serotonin-and growing evidence suggests that low levels of this neurotransmitter are a significant risk factor for psychopathology.

It's not surprising, many researchers say, that alterations in serotonin production or metabolism are linked to so many aberrant behaviors. Serotonin receptors are widespread throughout the brain, and the chemical helps regulate mood, arousal, aggression, impulse control, and sexual activity.

Among the new studies linking low serotonin levels to violent or aberrant behavior:

--Jeffrey Halperin et al. compared aggressive and non-aggressive boys with attention deficit hyperactivity disorder (ADHD). The researchers subjected both groups to a "challenge" with the drug fenfluramine, which provokes a response by the brain's serotonergic system. The results, they say, suggest diminished serotonin release and availability in the aggressive boys.

Aggression, suicide, impulsivity, and alcoholism have all been linked to low serotonin levels.

--Matti Virkkunen et al. believe they have identified a specific genetic variation which predisposes some individuals to suicidal behavior. Studying violent offenders, they found that one variant of the THP (tryptophan hydroxylase) gene, which codes for an enzyme necessary in the biosynthesis of serotonin, was strongly linked to suicide attempts, regardless of whether or not offenders were impulsive.

Numerous studies link suicidal behavior-often characterized as "aggression turned inward"-to low serotonin. Researcher Mim Landry says most studies show a correlation between low serotonin levels and "violent and/or impulsive suicide attempts, not premeditated suicide or nonviolent, passive attempts such as drug overdoses."

A second study by Virkkunen et al. found that low cerebrospinal fluid levels of a serotonin metabolite, 5-HIAA, were associated with poor impulse control (a major risk factor for criminal behavior) in alcoholics.

--Monkeys with low serotonin responsivity "displayed significantly more aggressive gestures in response to a threatening slide of a human being than did the high responders," in a 1995 study by Randall Kyes et al. Kyes says the data "support related findings in people and nonhuman primates linking reduced serotonergic activity and aggression."

"Aggression and brain serotonergic responsivity: response to slides in male macaques," Randall Kyes et al., *Physiol. & Behav.*, 57: 2, 1995. Address: Randall Kyes, Reg. Primate Research Ctr., University of Washington Health Sciences Building, SJ-50, Seattle, WA 98195.

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"Serotonergic function in aggressive and nonaggressive boys with ADHD," Jeffrey Halperin et al., *American Journal of Psychiatry*, 151: 2, February 1994. Address: Jeffrey Halperin, Department of Psychology, Queens College, 65-30 Kissena Blvd., Flushing, NY 11367.

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"Suicidality and 5-HIAA concentration associated with a tryptophan hydroxylase polymorphism," and "CSF biochemistries, glucose metabolism, and diurnal activity rhythms in alcoholic, violent offenders, fire setters, and healthy volunteers," both by Matti Virkkunen et al., both in *Archives of General Psychiatry*, 51, January 1994. Address for either: National Institute on Alcohol Abuse and Alcoholism, 9000 Rockville Pike, Building 10, Room 3C102, Bethesda, MD 20892.

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