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## Violence is in the air, say experts

**LEGISLATION:** A nutrient linked to aggression can be breathed in. A bill seeks to measure it.

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THE PRESS-ENTERPRISE

Manganese, an essential nutrient long suspected of causing violent behavior in high doses and long the focus of research into violent behavior, is once again getting the Legislature's attention.

Almost 20 years after a Riverside lawmaker's bill launched a landmark study of manganese's links to violence, another inland lawmaker wants to look at manganese levels in the air.

Assemblyman Anthony Adams, R-Hesperia, is carrying a bill that would require the California Air Resources Board to perform a statewide survey to determine areas saturated with a high level of manganese. The agency then would need to come up with ways to get that element out of the air.

Air-quality regulators for the Inland area said they have no evidence indicting a risk to manganese in the air.

Every cell in the human body uses manganese, and a deficiency of it will lead to death. It is also used in industrial processes, particularly the creation of iron and steel.

But too much of it, some experts say, can make a person prone to violence and certain mental disorders, particularly attention-deficit hyperactivity disorder.

### 'A SKEPTIC'

Adams said he was approached some years ago by Everett "Red" Hodges, an oilman-turned-activist spearheading the movement against manganese. Hodges told him about previous studies that seemed to indicate that manganese levels were higher in those who committed violent crimes.

"I'm very much a skeptic," Adams said. "I wanted to see the data for myself."

So Hodges got that data. He is the founder and president of the Violence Research Foundation in San Clemente, the sponsor of Adams' bill.

The foundation has studied manganese since its 1985 founding. Since then, researchers sponsored by the foundation and inspired by its claims alike have amassed a wealth of evidence and scientific studies, proving, Hodges says, that high levels of manganese cause violence.

"There is a physiological  
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## VIOLENCE

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marker for violence," Hodges said. That marker, he says, is manganese.

He cites a litany of research and studies, both long- and short-term, connecting manganese to violence in both humans and animals. The first, conducted between 1985 and 1990 by Dr. Louis Gottschalk, a UC Irvine psychiatry professor, found that manganese is substantially higher in the head hair of many violent offenders — 300 percent higher than normal in 60 percent of violent offenders in his study.

Hodges and others believe that excessive amounts of manganese damage and destroy the body's dopamine neurotransmitters, the portions of the brain that regulate mood and, in particular, pleasure.

### DIETARY LINK

Proper nutrition and vitamins can repair those neurotransmitters and reduce violence in afflicted individuals, Hodges said.

Most of the research Hodges cites focuses on dietary intake of manganese. Some of the most notable research Hodges cites, done by Dr. Francis Critella, of UC Irvine, focused on manganese taken during the early months of life, through soy-based infant formula. Such formulas can have around a hundred times the manganese of human breast milk. Infants do not have the biological tools needed to deal with the excess and are therefore far more susceptible to brain damage through manganese intake than adults.

Then the Legislature got involved. In 1989, former Riverside state Sen. Robert Presley introduced a bill that instituted a controlled study of nutrition on wards at the then-California Youth Authority.

The six-month study proved exactly what Hodges and Presley hoped it would: Wards who received vitamins became less likely to commit violent offenses. A reduction in violent offenses means less cost to taxpayers.

### LITTLE FOLLOW-UP

Except for Presley's bill, though, California lawmakers have not embraced the idea that manganese is linked to violence.

In 1994, then-Gov. Pete Wilson rejected a follow-up bill by Presley that called for testing nutritional intervention on state prisoners. Wilson objected to the makeup of the oversight board.

Six years later, legislation by Sen. Ross Johnson, R-Irvine, to allow similar nutritional intervention on children between the ages of 8 and 14 was defeated in the Assembly Public Safety Committee.

In 2004, the Assembly Public Safety Committee held a hearing on manganese and violence, but no bill ever emerged.

Unlike previous legislation, Adams' bill does not deal with dietary supplements — or criminals. It does only one thing: orders a survey of manganese in the air, which his office estimates will cost \$100,000.

Hodges said he is convinced that manganese in the air poses the kind of same risks as ingested manganese.

Adams, though, acknowledged at a Senate hearing in

early July that the current research is not specific enough to allow the Legislature to make judgments as to manganese's toxicity in the air.

### MANGANESE IN THE AIR

Air-quality regulators seem skeptical. The South Coast Air Quality Management District, which includes parts of Riverside and San Bernardino counties, said that the district monitors the air for manganese.

"To date, we haven't really seen any levels that are indicating a risk," spokeswoman Tina Cherry said.

Dr. Michael Kleinman, a community and environmental-health researcher at UC Irvine, worked on one of the studies on rats, to which Hodges referred. Kleinman said that when animals were exposed to manganese while still gestating, they were born with brain damage. He also said that this is the most likely way humans would be affected by airborne manganese.

"We have some evidence that airborne manganese may be a problem in a number of ways, and that the effects caused in utero may be a real problem," he said.

Kleinman said that while there are hints, at the moment, there is not enough information to be sure of the airborne effects:

"The inhalation route has been ignored for the most part because manganese levels are extremely low in the atmosphere," he said.

He said that conclusive studies of manganese's effect on people or animals exposed to it in the womb are needed.

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