

# Gulf War Illness Strongly Linked to Chemical Exposure

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MONDAY, March 10 (HealthDay News) -- A new scientific review finds a strong association between exposure to certain chemicals and the Gulf War illness suffered by many veterans.

The class of chemicals, known as acetylcholinesterase inhibitors (AChEIs), are found in pesticides, nerve agents and in pills given to soldiers to protect against nerve agents. The review, which was conducted by researchers at the University of California, San Diego, looked at 115 papers on the topic.

"Some of this has been stated for a while," said Joy Ray Miller, an assistant professor of pharmacy practice at the Irma Lerma Rangel College of Pharmacy at Texas A&M Health Science Center. "This article pulls it all together. It's definitely something to be aware of for our future veterans and for the military that's out there now. There are so many variants in the article that we can't really say as a matter of fact that [AChEIs cause the symptoms], but I think there are enough coincidences going on that we can have a pretty good understanding that maybe we should do something differently."

Veterans of the 1990-1991 Persian Gulf War have a higher rate of "chronic multi-symptom health problems" than either non-deployed military personnel or those deployed in other regions. In fact, 26 percent to 32 percent of personnel deployed to the Persian Gulf during this period have chronic health problems, a range that may actually understate the magnitude of the problem, according to the study, published in this week's issue of the Proceedings of the National Academy of Sciences.

Symptoms of the syndrome include fatigue, mood-cognition problems and musculoskeletal symptoms.

Although the exact causes remain unknown, evidence is mounting to suggest that exposure to organophosphate and carbamate acetylcholinesterase inhibitors (AChEIs), including pyridostigmine bromide (PB), pesticides and nerve agents, may be responsible.

The authors of this paper looked at epidemiological studies assessing the link between these chemicals and symptoms observed in Gulf War vets.

Many of the studies reported a link between exposure to AChEI and chronic symptoms.

An estimated 250,000 personnel received the carbamate pyridostigmine bromide (PB) as a pretreatment for potential exposure to nerve agents. Those who took more pills had a higher incidence of symptoms.

Also, an estimated 41,000 service members may have been overexposed to pesticides, which were used to control vector-borne disease, and 100,000 personnel may have been exposed to low levels of sarin nerve agent after the demolition of the Khamisiyah munitions depot in Iraq.

The symptoms are akin to those suffered by agricultural workers exposed to AChEIs, said the study authors, as well as symptoms suffered by victims of the sarin terrorist attacks in Japan.

Exposure to AChEIs could also be linked to the higher rate of amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease, in Gulf War veterans. Sporadic ALS has been associated with exposure to agricultural chemicals.

And men and women with the Gulf War symptoms were more likely to have lower concentrations and activity levels of enzymes which work to clear AChEIs from the system. Genetics may impact the way the body processes these chemicals, specifically the actions of these related enzymes.

"They're giving certain people so many of these nerve agent pills or pesticides, and [the authors] say that some people metabolize them and some not," Miller said. "Are we really giving a toxic dose apart from the genetics? What are they giving and have they really tested the amounts that they're giving? Are we overdosing?"

### **More information**

There's more on Gulf War syndrome at the [University of Chicago Medical Center](#).

SOURCES: Joy Ray Miller, Pharm.D., assistant professor, pharmacy practice, Irma Lerma Rangel College of Pharmacy, Texas A&M Health Science Center, Kingsville; March 10-14, 2008, Proceedings of the National Academy of Sciences

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