SOUTHWESTERN NEWS

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Veterans with Gulf War syndrome have damage in specific, primitive portion of nervous system, UT Southwestern researchers discover

DALLAS – Sept. 27, 2004 – UT Southwestern Medical Center at Dallas researchers have uncovered damage in a specific, primitive portion of the nervous systems of veterans suffering from Gulf War syndrome.

UT Southwestern researchers report that damage to the parasympathetic nervous system may account for nearly half of the typical symptoms – including gallbladder disease, unrefreshing sleep, depression, joint pain, chronic diarrhea and sexual dysfunction – that afflict those with Gulf War syndrome. Their findings will be published in the October issue of the *American Journal of Medicine* and are currently available online.

"The high rate of gallbladder disease in these men, reported in a previous study, is particularly disturbing because typically women over 40 get this. It's singularly rare in young men," said Dr. Robert Haley, chief of epidemiology at UT Southwestern and lead author of the new study.

The parasympathetic system regulates primitive, automatic bodily functions such as digestion and sleep, while the sympathetic nervous system controls the "fight or flight" instinct.

"They're sort of the mirror image of each other – the yin and the yang of the nervous system – that control functions we are not usually aware of. This is another part of the explanation as to why Gulf War syndrome is so elusive and mysterious," said Dr. Haley.

Previously, isolating pure parasympathetic brain function was difficult. In the new study Dr. Haley and his colleagues used a technique that monitors changes in approximately 100,000 heartbeats over 24 hours and measures changes in high-frequency heart rate variability – a function solely regulated by the parasympathetic nervous system.

After plotting the subtle changes in heart function using a mathematical technique called spectral analysis, researchers found that parasympathetic brain function, which usually peaks during sleep, barely changed in veterans with Gulf War syndrome even though they appeared to be sleeping. In a group of well veterans tested for comparison, the brain functions increased normally.

"The parasympathetic nervous system takes care of restorative functions of the body. During sleep it's orchestrating that process, which is why we feel refreshed when we wake up," Dr. Haley said. "Its failure to increase at night in ill Gulf War veterans may explain their unrefreshing sleep."

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The tests were conducted on 40 members of a Naval Reserve construction battalion, also known as Seabees. Both ill and healthy veterans from the same battalion were tested for comparison.

In addition, pure sympathetic nervous system functions were tested. In these tests, there were no appreciable differences between the two groups of veterans.

Dr. Haley first described Gulf War syndrome in a series of papers published in January 1997 in the *Journal of the American Medical Association (JAMA).* In previous studies, Dr. Haley and his colleagues presented evidence attributing the veterans' illness to low-level exposure to sarin gas – a potent nerve toxin – which drifted over thousands of soldiers when U.S. forces detonated Iraqi chemical stores during and after the Gulf War. A recent report from the Government Accountability Office confirmed that exposure to low-level sarin in the 1991 Gulf War was more frequent and widespread than previously acknowledged.

Subsequent research from Dr. Haley's group showed that veterans suffering from Gulf War syndrome also were born with lower levels of a protective blood enzyme called paraoxonase, which usually fights off the toxins found in sarin. Veterans who were in the same area and did not get sick had higher levels of this enzyme.

Dr. Haley and his colleagues have closely followed the same group of tests subjects since 1995. A new grant from the U.S. Department of Defense will allow Dr. Haley's team to undertake a study in a much larger sample of Gulf War veterans.

Other UT Southwestern researchers involved in the latest study include Drs. Wanpen Vongpatanasin, assistant professor of internal medicine; Gil Wolfe, associate professor of neurology; and Ronald Victor, chief of hypertension. Former UT Southwestern faculty members Drs. Wilson Bryan, Roseanne Armitage, Robert Hoffmann, Frederick Petty, and W. Wesley Marshall also contributed to this study, as did researchers from Phase 5 Sciences and Laboratory Industry Services, both in California.

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