

Chemically Induced Diseases:

Synergistic Effects and Cumulative Injuries Caused by Toxic Chemicals — Understanding the Gulf War Syndrome and Multiple Chemical Sensitivity [MCS]

By Richard Alexander

A major breakthrough in understanding the toxicological impact of multiple chemical exposures has been discovered by researchers at Texas Southwestern Medical School and the Duke University Medical Center.

The discoveries may have a profound impact on the manufacturing, testing and warnings required for all chemicals sold in the United States.

While U.S. law requires manufacturers report the acute symptoms and immediate first aid treatment for an overdose exposure to chemicals used in industry, as well as household products, the symptoms caused by chronic or low level, long-term

exposures are rarely mentioned in Material Safety Data Sheets [MSDS] and the reports of interactions caused by other chemicals are non-existent.

For example, in the course of discovery in a lawsuit arising from an unusual cluster of four leukemia deaths in a group of 200 Simpson Lumber Mill employees in Arcata, California, pentachlorophenol manufactured by Champion International and sold under the name of Woodlife, was used as a wood preservative and eventually proven to have high levels of dioxin.

Despite the fact that the manufacturer's technical staff was well aware of the chronic effects of exposure to this compound,



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Champion International never advised purchasers of Woodlife, or their employees, to be alert for evidence of acne that was commonly associated with individuals working in the application of Woodlife, or reports of rashes, nausea, vomiting, diarrhea, fatigue, dizziness, excessive perspiration, conjunctivitis or crusting of the eyes, depression or memory loss, insomnia or irritability, tingling or numbness in the extremities, blood in the urine or stool, burning sensation in the trachea or bronchi, nose bleeds, asthma-like symptoms, altered liver function, kidney or bladder infection or complaints, immune complaints, ongoing infections, children born with abnormalities, low sperm count, soft tissue sarcomas, unexplained fevers or night sweats, herpes sores or any skin disturbances below the eyes, at the temples or at the back of the neck or ears.

These symptoms are common signs of low level exposure to pentachlorophenol contaminated with dioxins and should not be confused with common conditions that have similar symptoms, such as colds or flu.

In fact these symptoms were commonly reported by Simpson Lumber Company employees, but no one ever made the connection between these symptoms and pentachlorophenol contaminated with dioxin until after plaintiffs' lawyers uncovered the fact Simpson had concealed the widespread use of pentachlorophenol from state department of health authorities.

Rarely can an MSDS be found that discusses harm from chronic exposures

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and equally rare is any mention of the synergistic effect of chemicals. Open any of these Material Safety Data Sheet sites to confirm that fact:

- Material Safety Data Sheets at Oxford University, UK — <http://physchem.ox.ac.uk:80/MSDS>
- Material Safety Data Sheets at Case Western Reserve — <http://research.nwfsc.noaa.gov/msds.html>

Synergism is the simultaneous action of separate agencies which, together, have greater total effect than the sum of their individual effects. The phenomenon is readily seen in the impact of drugs, but never mentioned on Material Safety Data Sheets required for the sale of toxic chemicals in the United States by the Environmental Protection Agency.

A recent breakthrough in the understanding of Gulf War Syndrome may be changing scientific thinking and promoting further research on chemical synergy.

Researchers at the Duke University Medical Center and the Texas Southwestern Medical School reported in April, 1996

that the simultaneous exposure to topical insecticides (DEET and permethrin) and pyrido-stigmine bromide, a drug taken prophylactically to counteract toxic gas warfare agents, causes nervous system damage in chickens. The full written report is scheduled for publication in the May 1996 issue of the *Journal of Toxicology and Environmental Health*.

Both the team led by Robert Haley at Texas Southwestern and Mohamed Abou-Donia's group of researchers at Duke found that the many symptoms experienced by Gulf War veterans, including headaches, fatigue, aches, decreased attention and rashes, were similar to the symptoms that presented in exposed chickens.

Chickens given any two chemicals became lethargic, unable to fly, lost weight and coordination and demonstrated tremors. For those administered all three chemicals, paralysis and death occurred. This observed impact on nerve functioning is significant because survivors of the Gulf War who were exposed to these toxic

agents also have demonstrated abnormal nerve function.

Further studies of Gulf War veterans who were exposed are being conducted at Texas Southwestern and are focusing on comparisons between physical findings in humans and those found in exposed chickens. The results of that work is awaited by veterans, who until now, have been unable to show any relationship between their multiple symptoms and their exposures during the Gulf War. More significantly, if these discoveries prove correct all manufacturers of commercial and household chemicals will be obligated to begin testing and instituting warnings of the synergistic effects of their products with other commonly used chemicals.

It is this new testing that holds promise for a better understanding of the impact of chemicals on health that has long been advocated by environmental activists, occupational health specialists, recipients of breast implants, those exposed to chlorinated hydrocarbons and sufferers of multiple chemical sensitivity. ■



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