

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 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. See [Dioxin In Pentachlorophenol: A Case Study Of Cancer Deaths In The Lumber Industry.](#)

Despite the fact that the manufacturer's technical staff was well aware of the chronic effects of exposure to this compound, Champion International never advised purchasers of Woodlife, or their employees, to be alert for an 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 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 Modhamed 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.

Addendum July 22, 1996

The research of Steven F. Arnold and others at Tulane University published in June, 1996 shocked the scientific community. It proves that hormone-disrupting chemicals, known to cause mild effects, when used in combination produce significantly dramatic hormonal effects "Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals," 272 Science 1489-1492 (June 7, 1996).

Combinations of two or three pesticides, which are commonly found in the environment at low levels, are up to 1600 times more powerful than any of the pesticides individually in their impact on hormones.

Some chemicals, which individually do not disrupt hormones, tremendously magnifies the ability of other chemicals to disrupt hormones. That was the finding with chlordane.

The study focused on endosulfan, chlordane, toxaphene and dieldrin, all of which impact a gene making estrogen in animals. Estrogen controls the formation and development of female organs and is strongly associated with both breast cancer and causing male sex organs to be deformed.

This is the beginning of a revolution in scientific knowledge that will profoundly effect the way pesticides are screened and tested.

This research should prompt EPA to immediately require appropriate warnings. Regulations have long been based on studies of individual chemicals and their individual effects. Now EPA must take steps to regulate combinations of chemicals in order to assure appropriate levels of public safety.

The policy implications of the synergistic effect of chemicals will cause a top to bottom re-vamping of chemical regulations. For years, EPA has not tested pesticide products as sold in containers in combination with other chemicals.

The example of chlordane is particularly disturbing because it means that EPA, manufacturers and the scientific community must now assess and evaluate of chemicals long believed to have minor hormonal impacts. Accomplishing such testing will take years and all the while significant damage to people will continue unabated.

The prevailing view that chemicals are safe until proven otherwise is no longer valid and all manufacturers must be required to prove the safety of their products when used in conjunction with other chemicals.

In the meantime, we must reduced the wide variety of chemicals used today and eliminate the use of pesticides until proven safe.

Addendum November 27, 2000

A medical research team headed by Dr. Robert Haley of the University of Texas Southwestern Medical Center at Dallas has discovered and reported brain damage in veterans of the Gulf War.

Doctors believe this brain damage to have been caused by exposure to combinations of low level nerve gas, anti-nerve gas tablets and DEET contained in insect pesticides and repellents. Magnetic Resonance Imaging has identified specific abnormalities in the basal ganglia that impact cognitive skills, including memory, sense of direction, inability to understand instructions and decision-making, often resulting in depression.

The findings were presented at the annual meeting of the Radiological Society of North America at its November, 2000 meeting in Chicago.

Richard Alexander is recognized by The State Bar of California as a certified specialist in civil trial law and was first certified as a civil trial lawyer by the National Board of Trial Advocacy in 1980. Emphasizing working relationships with clients has led to an exceptional [record](#) of success. He has served as a member of the Board of Governors of The State Bar of California, President of the Santa Clara County Bar Association and the Board of Governors of Consumer Attorneys of California. He is a founding member of the National Association of Consumer Advocates, and heads Alexander, Hawes & Audet, LLP. © Richard Alexander, 2000.

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