

LRA by ELISA/ACT® CLINICAL UPDATE # 14

Environmental Chemicals

Why does EAB test for environmental chemicals, and what are the new items on the test?

Over the years a variety of new technologies have been introduced to streamline and supposedly improve our foods, packaging materials, and many other commercial and industrial products. Unfortunately, many of these technological advances were too rapid, and the effects of the chemicals in these products on human health were not always evaluated. It is only now, after the fact, that the inductive role of many environmental chemicals on disease processes is coming to light. Almost every day a new report linking chronic health problems to some type of chemical or family of man-made chemicals appears.

EAB recognized the role of these environmental chemicals many years ago, and introduced several such agents into its Lymphocyte Response Assay (LRA) by ELISA/ACT® test profile. However, the public and many physicians were reluctant to accept the potential role of these agents in disease because too few scientists were reporting adverse health effects. The medical community is now ready, and for that reason EAB introduced a panel of 60 commonly encountered environmental chemicals.

The items offered in the LRA by ELISA/ACT were chosen for a variety of reasons. In some cases physicians and other health professionals requested specific items, but for the most part they were selected based on their ubiquitous

nature and damaging consequences for people with specific sensitivities. Most people do not give it a thought, but the wide array of chemicals we are continually exposed to is astounding! If you stopped to analyze each exposure over a 24-hour period you would be shocked!

Consider first what you eat! In a Standard American Diet (SAD) alone, one would be able to list 20 to 30 additives that may or may not have been tested for their safety. Furthermore, even if the additives were tested, they are not necessarily safe for all individuals. Some of these food additives are routinely added to improve or change the texture, appearance, storage, and/or flavor of foods. For example, it is almost impossible to find canned tuna without hydrolyzed vegetable protein. Another food additive, carrageenan, is routinely added to ice cream and many types of cheese and dairy products^{3,7,11}. The antioxidants BHT and BHA, which are also ubiquitous, are being added to many processed foods, such as breads, cereals, and baked goods as preservatives.

Unfortunately, not all of these food constituents are harmless! Potassium bromate, an oxidizing agent commonly used in the bread-making process, may be both toxic and a renal carcinogen¹⁵. A list of some common food additives included on LRA by ELISA/ACT is shown in Table 1.

TABLE 1: Common Food Additives

Carrageenan	Tragacanth
Aspartame	Saccharine
MSG	BHT, BHA

TABLE 1: Common Food Additives

Diacetyl	EDTA
Sodium Nitrite	Polysorbate
Propylene Glycol	Potassium Bromate
Silicone Dioxide	Sulfite/ Metabisulfite
Sodium Laurel Sulfate	Mono- and Diglycerides
Benzoate, Sodium or Potassium	Hydrolyzed Vegetable Protein: Soy

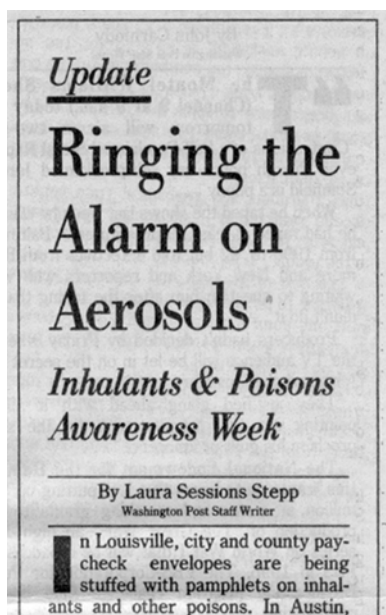
If you were to look in and around your home and workplace, you would also find a wide array of hidden chemicals. Volatile organic compounds, aliphatic hydrocarbons, and/or aromatic hydrocarbons are found in gasoline, household cleaners, paints, new carpets, new clothing, building construction materials, pesticides, fertilizers, and solvents^{8,16,19}. Solvents containing these chemicals are used in glues, cements, paint thinners, plastics, and adhesives for shoes. The solvents, 2-, and 3-methyl pentane (components of unleaded

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gasoline) are also commonly found in glues, whiteout, and varnishes.

Inadvertent exposure to these chemicals pose multiple health problems, but intentional use and abuse is also a serious problem. In the United States and elsewhere in the world, many of these volatile organic solvents are being inhaled by children and adolescents^{1,4}. Children are dying in record numbers from inhalation of these chemicals found in gasoline, aerosol sprays, cigarette lighters, whiteout, paint thinner, fingernail polish remover, and other household products⁴.



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The most commonly abused compounds include toluene, xylene, benzene, carbon tetrachloride, and derivatives of hexane^{1,4}. These are some of the toxic compounds included in the LRA by ELISA/ACT environmental chemical panel. If children have a sensitivity to these chemicals, they will be at even greater risk of developing chronic health problems.

Other environmental agents to which we are commonly exposed include the halogenated hydrocarbons, methylene chloride, vinyl chloride, chloroform, and trichloroethylene^{6,12,13}. For example, vinyl chloride is a primary component of polyvinyl chloride (PVC), which is used in packaging materials, aerosol sprays, and many pipes in commercial and

residential structures. Chloroform, formed during the chlorination of water, is released into the air during hot showers. Moreover, chloroform and other halogenated hydrocarbons are found in many of our commercially prepared food products, including cheese, butter, potatoes, and orange juice. Thus, we are exposed to these chemicals in many different ways.

How many people are sensitive to environmental chemicals?

Lucretius said in the 1st Century, "One person's meat is another person's poison." This wise statement is also true of environmental chemicals. Some people can be exposed to a variety of chemicals and exhibit no adverse effects, whereas other individuals can have only a brief exposure and suffer multiple symptoms. Preliminary test results from people who had the LRA by ELISA/ACT environmental chemical panel indicate that among healthy people or controls, the most common reactive agents are 2-methyl pentane, vinyl chloride, diacetyl, potassium bromate, BHT, food coloring, and BHA. The percent of persons reacting to these chemicals ranged from 14% for vinyl chloride to 36% for BHA. Whether these otherwise healthy persons will develop health problems with repeated exposure to these reactive agents is uncertain, but it is likely that some effects will be noted after several to many years.

Patients who already have health problems demonstrate strong and moderate reactions to multiple items on the environmental panel. Of 114 patients tested, reactions were noted to 46 of the 47 items, whereas responses to only 18 of the 47 items were observed in healthy controls. The one item that no one has had a response to is tragacanth, and this food additive is not as pervasive as the others. Plasticizers, gasoline, and food additives were the most common items

provoking reactions, as shown in Table 2.

TABLE 2: Percentage of Patients and Healthy Controls Reacting to Various Environmental Chemicals

Item	% of Patients Reacting	% of Controls Reacting
Phthalates	13	0
Maleic Anhydride	41	29
Vinyl Chloride	12	14
3-Methyl Pentane	16	0
Diacetyl	28	29
Potassium Bromate	6	14
Propylene Glycol	6	0
Silicates	7	0
HydroVegProtein	4	0
BHT	18	29

Data: HSC©'93

In general, many healthy and all patients demonstrated that adverse reactions to environmental chemicals are prevalent. However, sensitivity to a particular item is not always associated with readily identifiable or specific health symptoms. It may take prolonged or intermittent exposure to produce adverse signs and symptoms.

What health effects and chronic illnesses are most commonly associated with exposure to environmental chemicals?

Our susceptibility, resilience, and reserves determine the extent to which an environmental exposure has adverse consequences. More important than the exposure itself is our response to the exposure. When we have the detoxification mechanisms in both our cellular chemistry and perceptual apparatus, the adverse effects are minimized. When our resilience is low, exposure to chemical agents can bring about a variety of health symptoms. Reported symptoms have included neurologic manifestations such as depression, headache, vertigo, and confusion; gastrointestinal complaints such as nausea, bloating, gas, and diarrhea; respiratory disturbances such

as asthma, sore throat, rhinitis, and shortness of breath; musculoskeletal and joint pain, fatigue, dermatological complaints, and cardiovascular complications^{11,16}. The severity of the symptoms can range from subtle to debilitating, and the symptoms are not always dose related. This wide array of manifestations often makes diagnosis difficult.

Other health effects remain to be uncovered. Recent evidence indicates that many of the environmental pollutants have estrogen-like properties and may be a threat to fertility and possibly increase the risk of breast and testicular cancer^{5,9,18,20}. Some insecticides, pesticides, nonylphenols (found in spermicides, hair coloring products and toiletries), polychlorinated biphenyls, and breakdown products of plastics appear to behave like estrogen in the body. Carlsen et al reported a genuine decline in the quality of semen over the past 50 years²; they suggested that exposure to chemicals in our environment may be the cause. Moreover, Sharpe et al proposed that maternal exposure to environmental pollutants may cause congenital malformations of the testes and penis by altering the early development of sex organs¹⁸. Also, women who breast feed pass these pollutants on to their infants who may then fail to thrive or develop impaired cognitive abilities^{10,14,17}. These hypotheses have not been conclusively documented, but the number of epidemiological studies conducted to date demonstrate a strong link between reproductive disorders and exposure to pollutants.



What recommendations can be made to minimize or avoid exposure to such chemicals?

Avoiding exposure to environmental chemicals is unfortunately almost an impossibility unless you want to bid farewell to civilization. We are exposed to chemicals at home, on the road, and in the workplace. We breathe them, eat them, drink them, and absorb them through our skin. Many of these chemicals are not easily eliminated. However, exposure can be minimized by making certain lifestyle changes.

The first recommendation would be to buy only biodynamically grown or organic foods. Over the last few years, the availability of such foods has increased rapidly, so this is an achievable goal. In addition to eating organic foods, virtually all types of highly processed foods should be avoided, since they typically contain agents added during processing.

Choosing a reliable water source is also important, but this too can be problematic. It is always best to require companies selling bottled water to provide a detailed analysis of the chemicals in their water, so you can be sure of the product.

The task is more difficult when it comes to modifications in the home. New carpet should be off-gassed by the company prior to installation, and when possible, wool is the material of choice.

All natural fiber clothing and bedding materials are preferred, but even the dyes, bleaches, and other toxic finishing chemicals in cotton, linen, and wool can present problems. Sheets, shirts, underclothing, socks, and other clothing are available in organic cottons, but often these items are cost prohibitive.

Household cleaning products without noxious and toxic agents are also available and should be used whenever possible. The new organic/natural solvents, dishwashing detergents, all-purpose cleaners, spot removers, drain cleaners, pet care products, laundry products, and "bug repellents" contain no hazardous chemicals. They are not only better for your health, but also better for the health of the environment!

Although there are many other ways of reducing environmental exposure, such as avoiding cigarette smoke, alcohol, perfume, keeping car windows closed, and the like, we do not always have a choice. Because of that, nutrient supplementation should be considered. Most people don't even manage to take in through their diets amounts of essential nutrients considered adequate for preventing disease. Therefore, supplements are needed to achieve at least that amount. Then, additional supplements/nutrients are required to support the biochemical and physiological overload imposed by environmental toxicants, everyday life stresses, bacterial and viral infections, athletic training, trauma and disease, and any of the other life forces which increase nutrient demands.

At first it may be difficult to convince patients that changing their life patterns will improve the quality of their lives. However, once a change has been made, there is no turning back. Relief from the symptoms of environmental exposures by dietary and behavioral manipulations is enough to convince even the skeptic. Convincing those who are symptom free is not quite as easy, but being able to convince others would be cost effective in terms of health care.

What to do if sensitivities are suspected?

If immune sensitivities are suspected after a careful analysis and review of your patient, you may want to consider either the Complete LRA by ELISA/ACT or the newly introduced LRA by ELISA/ACT environmental chemical panel. To find out more about the LRA by ELISA/ACT testing EAB offers, call (800) 553-5472 or (703) 450-2980. We are excited by our latest capabilities for helping your difficult patients.

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Contact

If you have any questions or would like more information about LRA by ELISA/ACT testing, please contact EAB's Client Services Department at 800-553-5472.