ACCOMMODATING THE ALLERGIC EMPLOYEE IN THE WORKPLACE

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Defining the Allergic Employee

An allergy is an overreaction of the immune system to a substance. The function of the immune system is to recognize and eliminate agents that are harmful to the host. When the immune system is functioning properly, the foreign agents are eliminated quickly and efficiently. Occasionally the immune system responds adversely to environmental agents, resulting in an allergic reaction. When the immune system hyperracts, the response is out of proportion to, and more harmful than, the initial threat of the substance.

The details of all kinds of allergic reactions will not be discussed here, but one type occurs when antibodies bind to the environmental agent or antigen which has been taken into the body or makes contact with the skin or mucous membranes. This binding reaction causes chemicals from the body to be released which produce dilation of the blood vessels, the release of fluid causing swelling and inflammation. The main targets of this type of reaction are the skin (producing urticaria and atopic dermatitis), the respiratory system (producing rhinitis and asthma), the vasculature (causing anaphylactic shock), and the gastrointestinal tract (causing food allergies). These responses are called immediate hypersensitivity because they tend to occur quickly after rechallenge with an antigen to which the individual has been sensitized. Another type of allergic reaction, called delayed hypersensitivity, does not involve antibodies, but produces an inflammatory reaction by the action of specialized types of white blood cells. The target for this type of reaction can be almost any organ, but the classic example is the skin as in the case of contact dermatitis.

Anaphylactic shock is an allergic condition in which the antigen-antibody reaction takes place all through the body immediately after an antigen to which the person is sensitive has entered the circulatory system. If the reaction takes place in direct contact with the walls of the blood vessels or the muscles of the heart, damage to these tissues can result directly. The reaction causes the release of body chemicals which make the arteries and veins dilate, greatly reducing blood pressure in the arteries. The permeability of the capillaries increases causing a rapid loss of fluid from the blood and into the tissue spaces. The result of the great loss in blood returning via the veins to the heart is often so drastic that the resulting shock can produce death within minutes.

Hypersensitivity, or allergy, is not due to an alteration of the immune system by a foreign substance, but is an inappropriate activation of the immune system. So an allergy is a normal immune response with deleterious consequences, such as allergic rhinitis, hay fever, or contact sensitivity. In some of these cases, the response can be the source of tissue damage, so that suppressing certain immune reactions actually reduces tissue injury. Once sensitized, the affected individual becomes more sensitive to low concentrations.

Allergies to Workplace Exposures

Hypersensitivity from environmental exposures in the workplace can produce respiratory disorders, skin disorders, or anaphylactic shock. Numerous inhalants cause immune-mediated respiratory disorders, including some types of bronchial asthma, hypersensitivity pneumonitis, allergic rhinitis, and bronchopulmonary aspergillosis. Immune system involvement has also been seen for silicosis, asbestosis, coalworkers' pneumoconiosis, and possibly byssinosis. Allergic reactions of the

skin include allergic contact dermatitis (red rashes, swelling, itching, and sometimes blisters).

Although almost anyone can develop an allergy to a given substance, a distinct segment (15 - 20 percent) of the population is clinically atopic; that is, individuals who are unusually reactive to a variety of substances. Persons could have genetic differences that might predispose them to allergies to certain environmental and occupational antigens. However, it is very frequent that the individual who develops occupational asthma is nonatopic. This person may not get the symptoms at work, but may have a delayed response in the evening or at night. Characteristically, the individual develops the symptoms of asthma, which are wheezing, shortness of breath, cough, and sometimes chest tightness. The symptoms improve away from work, but get worse upon return to work.

Identifying the Sensitizer in the Work Environment

There is an enormous range of potential allergens in the workplace. Documented case histories involve a large number of substances, even though the numbers of people affected by any one substance may be very small. Below are listed some industrial chemicals which have been documented as producing allergic reactions. Additional information is available on the allergens which have been shown to be related to specific occupations or exposures.

Some common industrial chemicals associated with occupational asthma include:

- Platinum salts
- Nickel salts
- Pyrethrum (used as the bases of some insecticides)
- Diisocyanates (such as toluene diisocyanate or TDI)
- Ethylenediamine
- Phthalic anhydrides
- Colophony resins (derived from pine resin)
- Exotic wood dusts

Some common contact sensitizers of the skin include:

Poison ivy	European primrose
Benzocaine	Epoxy Resins
Mercaptan	Picric acid derivatives
Ethylenediamine	Formaldehyde
Thimerosol	Beryllium
Nickel	Cadmium
Chromates	Silver
Zirconium	Cutting oils
Paraphenylenediamine	
Carbon-iodine hydrocarbon compounds	

Occupational Exposure Limits and the Sensitive Worker

It would be most helpful in solving a workplace exposure problem if the specific allergen could be identified and the nature and extent of the exposure documented so that it could be addressed or reduced. Immunotoxicologists have identified many substances that have demonstrable immunotoxic effects in laboratory animals, and in a few instances, the effects of these substances have been observed in humans as well. Occupational experience has provided some evidence of substances' inadvertent immunotoxic effects in humans. For the most part, however, data are sparse on the effects of general exposure to immunotoxicants in the environment, although the scientific community does recognize that the immune system is an important target organ for toxicity.

Several Federal activities are designed to enhance public awareness of the hazards of toxic substances, including those which affect the immune system. OSHA's Hazard Communication Standards (29 CFR 1910.1200) and Laboratory Standard (29 CFR 1910.1450) require that workers be provided with information about the known health hazards of their jobs. However, since so little information is available regarding immunotoxic effects, and since the Standards cannot be used to compel testing, the Standards do little at present to protect workers from potential allergens. OSHA does have a substance-specific standard dealing with formaldehyde (29 CFR 1910.1048).

OSHA's occupational exposure limit regulations were recently rolled back to the 1971 limits due to a court decision. Newer limits which had been set in 1989 on some chemicals to prevent allergic reactions have, as a result, been either eliminated or reverted to the older limits. Only a few potential sensitizers are presently regulated by OSHA:

- Cobalt metal, dust, and fume *(Respiratory System)*
- Formaldehyde *(Skin and Respiratory System)*
- Isophorone Diisocyanate *(Skin and Respiratory System)*
- Phenyl Glycidyl Ether *(Skin)*
- Picric Acid *(Skin)*
- Toluene-2,4-Diisocyanate *(Respiratory System)*

Most scientists agree that the lack of human test data should not preclude efforts to control human exposures to suspected immunotoxicants, but the absence of data will ensure continued disagreement about suitable means and levels of control. It is important to note that in regulating exposure to potential allergens, the nature of the dose is significant: to prevent adverse health effects, should the exposure be handled as an eight-hour time-weighted-average dose (such as a workshift) or as a peak dose or as an intermittent high dose? Then the occupational exposure should be controlled accordingly. Some information indicates that perhaps high intermittent doses can result in sensitization or can affect individuals who are sensitive. There is some evidence to indicate that the exposure may have been a one-time event to produce sensitization. Another problem with setting exposure limits for an immune system-related response is the

challenge of developing an acceptable exposure limit for an event that does not appear to either have a threshold or fit the standard dose-response relationship.

Accommodating the Allergic Employee

Once an employer learns an applicant or employee is allergic, and inneed of an accommodation, the employer may be required by the Americans with Disabilities Act to provide the needed accommodation. The allergic worker may be able to respond to low levels of exposure, levels which may be lower than the relevant occupational exposure limits set by OSHA or recommended by agencies such as NIOSH or organizations such as the ACGIH. Accommodating the allergic employee would therefore generally involve reducing exposure further by providing specific protection for the sensitive individual, such as additional protective equipment which the average (nonallergic) worker probably wouldn't need. Protective equipment could involve the use of respirators for respiratory protection or protective clothing (such as gloves) or barrier creams for skin protection. The use of respirators would involve employer compliance with OSHA's Respiratory Protection Standard (29 CFR 1910.134) including the use of a physical to determine whether a worker could wear a respirator. Battery-powered respirators may enable those with pulmonary or cardiovascular problems to still use a respirator. Respirators made of silicone may enable someone to wear a respirator who has a rubber allergy (such as an allergy to mercaptobenzothiazole).

Exposure could be reduced by the use of engineering controls such as better or more efficient use of ventilation to dilute or remove exposure; improved equipment design to reduce the production of vapors, mists, and splashes; or enclosures of equipment or processes to contain or collect any emissions. Air cleaning equipment could be used to reduce the air concentration of a potential allergen in the work area of a sensitive individual. Exposure may be reduced by scheduling changes which do not place the sensitive worker in a work area at the same time that a potential allergen is being used. (For example, avoiding the use of products such as cleaning chemicals or pesticides or paints in the sensitive person's office or work area.)

One important accommodation would include having personnel aware of what to do or who to call (such as emergency telephone numbers) if the allergic person experiences an adverse reaction such as an asthmatic attack or anaphylactic shock. The allergic person's physician should be consulted as to what such measures should include (such as having antihistamines or brochodilators available for emergency use).

However, these are some other alternatives to consider which could reduce or altogether remove the potential for exposure to an allergen: product substitution, the use of an alternative formulation for the chemical or material being used, eliminates containing or using the potential allergen. (For example, to avoid asthma from inhalation of persulfate boosters in hair bleaches, a hairdresser could use a bleach with a non-persulfate booster such as sodium perborate, sodium percarbonate, or magnesium carbonate.) Process substitution reduces or eliminates exposure to an allergen by the use of an alternative method for doing a job. (For example, to avoid skin or respiratory allergies from the use of cold sterilization with formaldehyde solutions, sterilization using steam or ultraviolet light could be considered.) Both product and process substitution may be well worth investigating because they may have advantages to the employer in the areas of cost savings on hazardous waste disposal, less potential liability for handling or storage of hazardous materials, reduced need for extra or special ventilation or protective equipment/clothing, reduced needs for fire or other types of insurance, reduced workers' compensation costs for injuries or illnesses, etc. Moreover, substitutions may have the added advantage of reducing exposure for other workers who have not yet shown any adverse health effects.

For some chemical exposures, it may be possible to have medical testing to determine if an individual is likely to have an allergic reaction to an exposure or to diagnose hyperreactive respiratory airways. It is important that such testing be performed post-job offer or by a physician who reports to the employer only the information as to whether the employee can perform the requirements of the job and what accommodations might be necessary so that privacy can be protected and the potential for discrimination reduced.

Resources

For information on the Americans with Disabilities Act and accommodations the following can be contacted:

ADA Regional Disability and Business Technical Assistance Center Hotline, (800) 949-4232 (voice/TTY).

Job Accommodation Network, (JAN), West Virginia University, PO Box 6080, Morgantown, WV 26506-6080, (800) ADA-WORK (voice/TTY).

The Equal Employment Opportunity Commission, 1801 L Street, N.W., Washington, DC 20507, 800-669-4000 (Voice) to reach EEOC field offices; for publications call (800) 800-3302 or (800)-669-EEOC (voice/TTY).

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