

CLINICAL SPECIFICATIONS

FORMALDEHYDE + GLUTARALDEHYDE

Chemical Found In:

Formaldehyde (CH₂O) and Glutaraldehyde (CH₂(CH₂CHO)₂) are organic compounds used often used as preservatives in cosmetic and personal care formulations. Formaldehyde-based materials are also common to the manufacture of automobiles, building materials, and particle boards. Glutaraldehyde is used to disinfect medical and dental equipment and for industrial water treatment.

Sources:

Formaldehyde
<http://www2.epa.gov/formaldehyde/facts-about-formaldehyde#howcan>

Glutaraldehyde
<http://www.cdc.gov/niosh/topics/glutaraldehyde>

Known Cross-Reactions: Formaldehyde with Acetaldehyde⁴

Clinical Significance:

The detection of antibodies to Formaldehyde + Glutaraldehyde bound to human protein in serum indicates a breakdown in immunological tolerance and induction of chemical intolerance. Formaldehyde + Glutaraldehyde or their metabolites can bind to human tissue proteins and form neo-antigens. These new antigens are comprised of the haptenic chemical plus the tissue antigen. The formation of neo-antigens initiates an immune response which may result in antibody production against the chemical and the human tissue. Continued exposure to the chemical and the subsequent production of antibodies against various tissue antigens, may result in autoimmune reactivity.

Persons with antibodies to Formaldehyde + Glutaraldehyde bound to human protein in serum should avoid exposure to the substances.

References:

1. Lyapina, et al. Allergic contact dermatitis from formaldehyde exposure. J IMAB, 2012; 18(4):255-262.
2. Pacenti, et al. Evaluation of the occupational exposure to glutaraldehyde in some endoscopic services in an Italian hospital indoor built environ, 2006;15(1):63-68.
3. Madison, et al. Immunologic biomarkers associated with an acute exposure to exothermic byproducts of a ureaformaldehyde spill. Environ Health Perspect, 1991; 94:219-223.
4. Pietrzak, et al. Antibodies made against a formaldehyde protein adduct cross-react with an acetaldehyde protein adduct. Implications for the origin of antibodies in human serum which recognize acetaldehyde-protein adducts. Alcohol Alcohol, 1995; 30(3):373-378.
5. Thrasher, et al. Evidence for formaldehyde antibodies and altered cellular immunity in subjects exposed to formaldehyde in mobile homes. Arch Environ Health, 1987; 42(6):347-350.
6. Thrasher, et al. Antibodies and immune profiles in individuals occupationally exposed to formaldehyde: six case reports. Am J Indust Med, 1988; 14:479-488.
7. Van Birgelen, et al. Effects of glutaraldehyde in a 2-year study in rats and mice. Toxicologic Sci, 2000; 55:195-205.
8. World Health Organization. Formaldehyde. Air quality guidelines (2nd Edition). Regional Office for Europe, Copenhagen, Denmark, 2001:Chapter 5.8.