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## DEODORANTS AND ANTI-PERSPIRANTS

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A deodorant is a substance applied to the body to prevent body odor caused by the bacterial breakdown of perspiration in armpits, feet, and other areas of the body. A subgroup of deodorants, antiperspirants, affect odor as well as prevent sweating by affecting sweat glands.

Deodorants are classified and regulated as cosmetics by the U.S. Food and Drug Administration (FDA) and are designed to eliminate odor. Deodorants are often alcohol-based. Alcohol initially stimulates sweating, but may also temporarily kill bacteria.

Other active ingredients in deodorants include sodium stearate, sodium chloride and stearyl alcohol. Deodorants can be formulated with other, more persistent antimicrobials such as triclosan that slow bacterial growth or with metal chelant compounds such as EDTA. Deodorants may contain perfume fragrances or naturalessential oils intended to mask the odor of perspiration. In the past, deodorants included chemicals such as zinc oxide, acids, ammonium chloride, sodium bicarbonate and formaldehyde, but some of these ingredients were messy, irritating to the skin or even carcinogenic.

Over-the-counter products labeled as "natural deodorant crystal" containing the chemical potassium alum, which contains aluminum, have gained new-found popularity as an alternative health product, in spite of concerns about possible contact dermatitis. A popular alternative to modern commercial deodorants is ammonium alum, which is a common type of alum, also containing aluminum, sold in crystal form and often referred to as a *deodorant crystal*. It has been used as a deodorant throughout history in Thailand, the Far East, Mexico and other countries.

Methenamine based antiperspirant for treatment of excessive sweating

Deodorants combined with antiperspirant agents are classified as drugs by the FDA. Antiperspirants attempt to stop or significantly reduce perspiration and thus reduce the moist climate in which bacteria thrive. Aluminium chloride, aluminium chlorohydrate, and aluminium-zirconium compounds, most notably aluminium zirconium tetrachlorohydrate gly and aluminium zirconium trichlorohydrate gly, are frequently used in antiperspirants. Aluminium chlorohydrate and aluminium zirconium tetrachlorohydrate gly are the most frequent active ingredients in commercial antiperspirants. Aluminium-based complexes react with the electrolytes in the sweat to form a gel plug in the duct of the sweat gland. The plugs prevent the gland from excreting liquid and are removed over time by the natural sloughing of the skin. The metal salts work in another way to prevent sweat from reaching the surface of the skin: the aluminium salts interact with the keratin fibrils in the sweat ducts and form a physical plug that prevents sweat from reaching the skin's surface.

Aluminium salts also have a slight astringent effect on the pores; causing them to contract, further preventing sweat from reaching the surface of the skin. The blockage of a large number of sweat glands reduces the amount of sweat produced in the underarms, though this may vary from person to person. Methenamine in the form of cream and spray is successfully used for treatment of excessive sweating and related to it odour. Antiperspirants are usually better applied before bed.

Deodorants and antiperspirants come in many forms. What is commonly used varies in different countries. In Europe, aerosol sprays are popular, as are cream and roll-on forms. In the United States, solid or gel forms are dominant.

After using a deodorant containing zirconium, the skin may develop an allergic, axillary granuloma response. Antiperspirants with propylene glycol, when applied to the axillae, can cause irritation and may promote sensitization to other ingredients in the antiperspirant. Deodorant crystals containing synthetically made potassium alum were found to be a weak irritant to the skin. Alcohol-free deodorant is available for those with sensitive skin. Frequent use of deodorants was associated with blood concentrations of the synthetic musk galaxolide.

Aluminum is present most often in antiperspirants in the form of aluminum chlorohydrate. Aluminum chlorohydrate is not the same as the compound aluminum chloride, which has been established as a neurotoxin. At high doses, aluminum itself adversely affects the blood-brain barrier, is capable of causing DNA damage, and has adverse epigenetic effects.

The myth that breast cancer is linked with deodorant use has been widely circulated, and appears to originate from a spam email sent in 1999; however, there is no evidence to support the existence of such a link. One constituent of deodorant products which has given cause for concern are parabens, a chemical additive. According to the American Cancer Society "studies have not shown any direct link between parabens and many health problems, including breast cancer".

The FDA has "acknowledge[d] that small amounts of aluminium can be absorbed from the gastrointestinal tract and through the skin.", leading to a warning "that people with renal dysfunction may not be aware that the daily use of antiperspirant drug products containing aluminium may put them at a higher risk because of exposure to aluminium in the product." The agency warns people with renal dysfunction to consult a doctor before using antiperspirants containing aluminum.

If aerosol deodorant is held close to the skin for long enough, it can cause an aerosol burn—a form of frostbite. In controlled tests, spray deodorants have been shown to cause temperature drops of over 60 °C in a short period of time.

Aluminium zirconium tetrachlorohydrate gly, a common antiperspirant, can react with sweat to create yellow stains on clothing. Underarm liners are an alternative to antiperspirants that do not leave stains.