

Polyethylene glycol (PEG) derivatives in cosmetic products induce anti-PEG IgM production in mice

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Polyethylene glycol (PEG) polymers are generally recognized as biologically inert and non-immunogenic. PEG is commonly used in bioconjugation and nano-formulations to improve the circulation half-life of the formulations and increase their stability. In cosmetics, PEG derivatives are also widely used as emulsifiers and skin penetration enhancers. Recently, the “pre-existing” anti-PEG antibodies have been reported in healthy individuals who have never received treatment with PEGylated formulations. In a murine study, topically applied PEG derivatives could efficiently penetrate the stratum corneum and reach the systemic circulation. Daily application of cosmetic PEG derivatives primed the immune system, inducing anti-PEG IgM production. Anti-PEG IgM was detected by Day 14 in mice with normal skin, while it was detected as early as Day 7 in mice with compromised skin. In addition, in mice with pre-induced anti-PEG IgM, topically applied PEG derivatives appeared to bind to the pre-induced anti-PEG IgM, lowering blood levels. Current results indicate that PEG derivatives in cosmetic products may be an important contributor to the source of the “pre-existing” anti-PEG antibodies that have been detected in healthy individuals.