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Med Hypotheses. 2000 Apr;54(4):663-71.

A theoretical model based upon mast cells and histamine to explain the recently proclaimed sensitivity to electric and/or magnetic fields in humans.

Gangi S, Johansson O.

Source

Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, Stockholm, Sweden.

Abstract

The relationship between exposure to electromagnetic fields (EMFs) and human health is more and more in focus. This is mainly because of the rapid increasing use of such EMFs within our modern society. Exposure to EMFs has been linked to different cancer forms, e.g. leukemia, brain tumors, neurological diseases, such as Alzheimer's disease, asthma and allergy, and recently to the phenomena of 'electrosensitization' and 'screen dermatitis'. There is an increasing number of reports about cutaneous problems as well as symptoms from internal organs, such as the heart, in people exposed to video display terminals (VDTs). These people suffer from subjective and objective skin and mucosa-related symptoms, such as itch, heat sensation, pain, erythema, papules and pustules. In severe cases, people can not, for instance, use VDTs or artificial light at all, or be close to mobile telephones. Mast cells (MCs), when activated, release a spectrum of mediators, among them histamine, which is involved in a variety of biological effects with clinical relevance, e.g. allergic hypersensitivity, itch, edema, local erythema and many types of dermatoses. From the results of recent studies, it is clear that EMFs affect the MC, and also the dendritic cell, population and may degranulate these cells. The release of inflammatory substances, such as histamine, from MCs in the skin results in a local erythema, edema and sensation of itch and pain, and the release of somatostatin from the dendritic cells may give rise to subjective sensations of on-going inflammation and sensitivity to ordinary light. These are, as mentioned, the common symptoms reported from patients suffering from 'electrosensitization'/'screen dermatitis'. MCs are also present in the heart tissue and their localization is of particular relevance to their function. Data from studies made on interactions of EMFs with the cardiac function have demonstrated that highly interesting changes are present in the heart after exposure to EMFs. One could speculate that the cardiac MCs are responsible for these changes due to degranulation after exposure to EMFs. However, it is still not known how, and through which mechanisms, all these different cells are affected by EMFs. In this article, we present a theoretical model, based upon observations on EMFs and their cellular effects, to explain the proclaimed sensitivity to electric and/or magnetic fields in humans.

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PMID:

10859662

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