Distorted Current-Flow – A Major Causative Factor in EMF Hypersensitivity?: A Hypothesis

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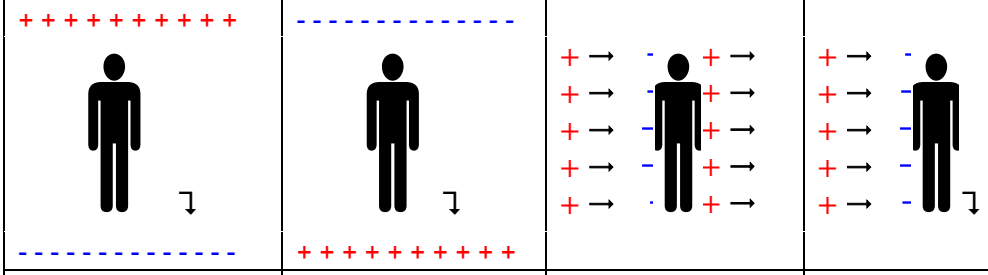
Introduction

Environment and lifestyles have changed considerably over the past two hundred years. In particular the use of electricity and synthetic materials has greatly altered the electromagnetic nature of the environments most individuals in developed countries occupy. Exposure to beneficial natural electromagnetic phenomena has also been greatly reduced, as have opportunities for the body to be grounded. EMF hypersensitivity syndrome has developed partially as a result of these changes.

Objectives

The aim of this presentation is to demonstrate that naturally occurring electromagnetic fields provide important biological cues and influence the direction of current flow in the body. It is proposed that distorted, impeded or inverted current-flow in the body is a major causative factor of EMF hypersensitivity syndrome, and may have a marked effect on lifespan, well-being and productivity.

Possible Charging Regimes Influencing Current Flow in Body (partial listing)



Fair-weather field with sky acting as anode and ground as cathode	Poor-weather field creating triboelectric inversion	Ungrounded body adjacent strong positive charge.	Grounded body adjacent strong positive charge.

"Poor-weather" fields can act as biological stressors by altering the direction of current flow in the body. It is suggested that "electrosmog" from man-made EMF phenomena can cause similar physiological effects to these fields by distorting current flow and cellular communication. However whilst "poor-weather" fields are transient phenomena, people are often encapsulated in "electrosmog" for large portions of the day. "Electrosmog" need not just be caused by electrical equipment. Synthetic materials too are often capable of generating high electrostatic fields that can greatly influence the deposition of airborne chemicals onto the body and may lead to forms of electrochemical sensitivity. Such fields can also significantly reduce the body's intake of charged oxygen. Reduced intake of charged oxygen, particularly $3O_2{\cdot}$-, may have particularly detrimental effects on the body (Goldstein and Arshavskaya, 1997).

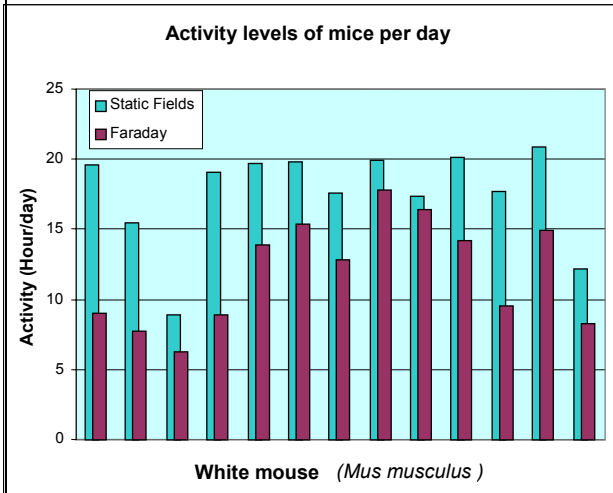
Methodology

Field-studies and an extensive literature review were undertaken to investigate factors that may cause EMF hypersensitivity syndrome. Research into the effects of natural EMFs on biological functioning has proven to be of particular interest, indicating possible mechanisms that may be detrimentally affected by the present man-made electromagnetic environment.

Results and Assessment of their Significance

Comparison of Static Field and Faraday cage conditions

Activity Levels



In experiments by Altmann (1969, 1974), budgerigars (*Melopsittacus undulatus*), zebra finches (*Taeniopygia guttata castanotis*) and house mice (*mus musculus*) were used to determine the effects of exposure to static field and Faraday cage conditions on activity levels.

Increased activity was noted in all instances under continuous static fields of a variety of electric field strengths, whilst Faraday cage conditions caused a marked reduction.

Intermittent direct current static fields, pulsed in the same direction as the continuous static fields, and alternating 10 Hz fields also increased activity levels.

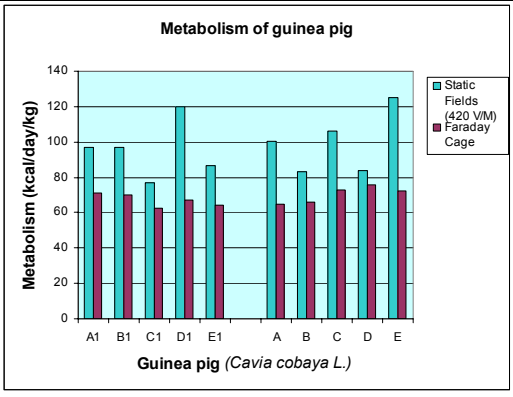
Average daily activity levels of house mice in relation to location in an electric field or in a Faraday cage.

● Many modern concrete buildings greatly resemble Faraday cages, preventing the passage of natural electrical fields and frequencies to a greater or lesser degree, whilst isolating occupants from ground potential. Such shielding effects current flow in the body and can detrimentally affect the mental performance and activity levels of humans.

Metabolism

Under static fields, as opposed to Faraday cage conditions, elevated metabolic rates were noted in tests undertaken on the following animals by Altmann: Honey bees (Apis mellifica), germanic wasps (Vespa germanica), goldfish (*Carassius auratus*), frogs (*Rana esculenta*), house mice (*mus musculus)* and guinea pigs *(Cavia cobaya*).

The presence of the electrostatic field significantly enhanced the metabolic rates of the house mice tested by Altmann with ≤ 30% more oxygen being utilized than when animals were in Faraday cages.



●Studies by Speakman et al., (2004) have shown that fast metabolisms can dramatically increase lifespan.

Oxygen Consumption

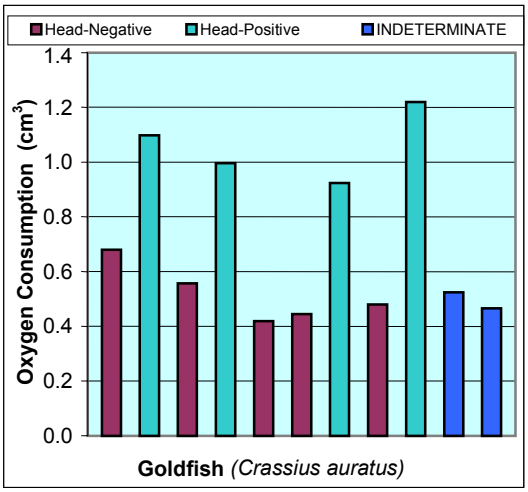
Simulation of naturally occurring electromagnetic fields can greatly effect oxygen consumption. It is suggested that man-made fields also have this capability.

Effects of simulated natural weather conditions on oxygen uptake of isolated mouse liver tissue. (Source: Lotmar et al 1968, 1969)

Type of Impulse Program	Carrier-Frequency	Impulse-Frequency	Field Intensity	Mean Oxygen Consumption of White Mouse Liver Tissue
Simulated cyclonic weather programs	**10 – 100 kHz**	**30 – 100 Hz**	**> 100 mV/m**	**42% reduction ± 2, 8%**
Good weather narrow-band	**- 10 kHz**	**3 – 10 Hz**	**10 mV/m**	No effect shown

Note: A Faraday cage was used to shield natural atmospheric impulse frequencies and Helmholtz coils used to simulate the Earth's magnetic field.

Effect of current flow



The oxygen consumption of a goldfish in galvanic field of 2 volts (length of test period: 15 minutes).
This experiment was also undertaken on frogs placed in water. Similar results were recorded.

The direction of current flow in the atmosphere, or in an individual microenvironment, can influence the direction of current flow in the body.

The direction that current flows in the body can markedly effect oxygen consumption.

In experiments by Altmann (1969, 1974), marked differences were noted in animals' oxygen consumption depending whether their heads were located towards the anode or the cathode. It is suggested that these changes are similar to those that an upright human would obtain under normal fair-weather and poor-weather fields.

Altmann has also demonstrated the anode/cathode effect in a galvanic field. When the direction of the fish was indeterminate, a reduction in oxygen-uptake appeared similar to that exhibited under reversed current flow.

The importance of oxygen consumption

1931 Nobel Prize winner, Dr. Otto Warburg, discovered that "sub-optimal oxygenation of cells and tissues is a prime factor in cancer and degenerative diseases". He also demonstrated that reduced levels of useable oxygen place stress on the body and decrease brain efficiency.

●When the body receives sub-optimal levels of oxygen due to poorly designed electromagnetic environments it is more prone to demonstrate symptoms of EMF hypersensitivity.

Conclusions

Research to date would appear to indicate that electromagnetic pollution affects the physiological processes of everyone, not just those presently exhibiting EMF hypersensitivity syndrome.

The solutions to this problem need not always involve excessive cost just good science. Perhaps the fact that adopting such strategies is highly likely to increase the efficiency and profitability of businesses, whilst reducing absenteeism due to illness and stress, will encourage the necessary investment in this field.

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