

POSSIBLE MECHANISMS OF ACTION OF ELECTROMAGNETIC FORCES ON LIVING ORGANISMS

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Various specific effects of many types of electromagnetic energy on living organisms have been reported since the time of Mesmer, 1800. Such effects continue to be reported until at the present writing almost every type of EM energy from static magnetic or electrical fields to UHF have been implicated as causal factors in biological events. The commonest biological reactions reported have been in two areas. First, the central nervous systems with relationships being established between levels of activity, biological cyclic behavior patterns and psychiatric disturbances and second, the general area of growth processes with both acceleration of normal growth or healing being reported along with reports of the inhibition or regression of malignant tumor growth. At this writing (December, 1971), experimentation involving humans is being conducted in many countries including the U.S. and a commercial device is soon to be marketed in this country - claimed to promote the healing of skin ulcerations by the administration of low level direct current.

Nevertheless, the body of science is still reluctant to accept the thesis that electromagnetic energy has any specific effect, other than thermal, on living organisms. The primary problem appears to be that the current standard concepts of the physiology and organization of organisms fail to provide a rational basis for such interactions. It would appear to be of primary importance that the mechanism of interaction between such forces and living organisms be determined. First, without such knowledge, applications will continue to be empirical only and therapeutic applications of great value may remain undiscovered. Secondly, without such knowledge, the possibility of serious undesirable side effects cannot be predicted or anticipated and with the probability that commercial therapeutic applications may soon be widespread, the possibility of a major disaster in the future cannot be overlooked. This paper will present several instances of proven electromagnetic interactions with living organisms which have been determined in the author's laboratory (1-9). These include both central nervous systems effects (10-13) and growth effects of considerable therapeutic interest (14-18). Most importantly, a test system has been devised at the cellular level (19) that permits some evaluation of hypotheses and determinations of effective parameters for possible clinical applications. Evidences will be presented for the thesis that organisms possess, at the cellular and tissue level, semiconducting properties which are

important components of basic control systems (20-24) and that this is the site of interaction between electromagnetic forces and living organisms. Such a view permits evaluation of additional possible interactions as well as enabling us to devise experimentation to determine the extent, properties and importance of solid state phenomena in living organisms.

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