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Restoration of nerve ultrastructure and recovery from motor neuropathy in mice by electromagnetic field

The effect of electromagnetic fields (EMFs) on the restoration of forelimb grip strength and radial nerve ultrastructure was studied in mice with motor neuropathy induced by the administration of neurotoxin, 0.62% 3,3'iminodipropionitrile (IDPN), in drinking water for 9 1⁄2 weeks. Forelimb grip strength (lb) of mice as measured by a force gauge meter declined to 47% compared to the control group ($p<0.004$). The IDPN treated group without any EMF exposure persisted to have a 56% decrease in grip strength and radial nerve electron micrographs showed axonal demyelination, mitochondria in an orthodox state of conformation, (nonfunctional) and uneven dispersion of neurofilaments and microtubules. In contrast, one IDPN treated group was treated with applied EMF (electromagnetic field) intensities and frequencies that were calculated on the basis of the mass of molecules vital to nerve function using $mc^2 = BvLq$ and $f = qB / 2\pi m$. During EMF exposure mice were held in a perforated Lucite box placed in a Resonator that generated the EMF between the centers of two 18" discs, 9" apart containing copper coils in Helmholtz configuration. EMF was applied twice weekly for 8 1⁄2 weeks that resulted in as much as 87% recovery ($p<0.05$) of grip strength that was sustained after the termination of exposure at an 82% level until the 27th week of observation. The EMF exposed group also exhibited axonal remyelination, functional condensed state of mitochondria, and evenly dispersed neurofilaments and microtubules consistent with grip strength recovery. [These results are the first to demonstrate a biological effect of EMF in vivo on the restoration of subcellular structures required for nerve impulse conduction and metabolism in nerves and consequently a grip strength recovery from motor neuropathy, under controlled experimental conditions.] The studies were conducted at the Weill Medical College of Cornell University, and replicated at Fairleigh Dickinson University, School of Natural Sciences.

Biography

Professor Jerry I Jacobson is an eminent expert in the field of Bioelectromagnetics, having pioneered research utilizing physiologic Pico Tesla magnetic fields in the treatment of a diversity of conditions. His discovery of Jacobson Resonance yielded a new, non-invasive technology prototyped and characterized by NASA engineers at the John C. Stennis Space Center. As a world renowned medical physicist, he has lectured extensively, published more than 100 scientific articles in peer reviewed journals, and has invented 50 patents. He is currently the Chairman of the Institute of Theoretical Physics and Advanced Studies for Biophysical Research which has directed research at a dozen universities throughout the world for the past 20 years. Among his numerous biographical listings are: Who's Who in America, Who's Who in the World, Who's Who in Science and Engineering, and Who's Who in American Inventors. He is the Chief Science Officer for several biotech companies.

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