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PICK OF THE WEEK #1: MORE THAN 2000 DOCUMENTS PRIOR TO 1972 ON BIOEFFECTS OF RADIO FREQUENCY RADIATION

July 5, 2010. More than 2000 Documents prior to 1972 on Bioeffects of Radio Frequency Radiation.

NAVAL MEDICAL RESEARCH INSTITUTE



Glaser, Z.R. 1972. *Bibliography of reported biological phenomena ('effects') and clinical manifestations attributed to microwave and radio-frequency radiation.* Naval Medical Research Institute MF12.54.015-004B, Report No. 2, revised. 106 pp.

ABSTRACT

More than 2000 references on the biological responses to radio frequency and microwave radiation, published up to June 1971, are included in the bibliography.* Particular attention has been paid to the effects on man of non-ionizing radiation at these frequencies. The citations are arranged alphabetically by author, and contain as much information as possible so as to assure effective retrieval of the original documents. An outline of the effects which have been attributed to radio frequency and microwave radiation is also part of the report.

*Three supplementary listings bring the number of citations to more than 2,300.

Note: This document is "unclassified" and "has been approved for public release and sale; its distribution is unlimited."

SIGNIFICANCE . . .

The value of the Glaser 1972 document is to counter the statements that "credible" research does not exist showing non-thermal effects. This is a false statement promoted by those who are either unaware of the literature or unwilling to admit this radiation, at levels to which we are currently exposed, can be harmful.

Credible research does exist; it has been around for decades; and it has been largely ignored by those responsible for public and occupational health.

COMMENTS . . .

This is one of the first large scale reviews of the literature on the biological effects of microwave and radio frequency radiation and it first appeared in 1971. The author classified the biological effects, into 17 categories (see below). These categories include heating (thermal effects); changes in physiologic function; alterations of the central, autonomic and peripheral nervous systems; psychological disorders; behavioral changes (animal studies); blood and vascular disorders; enzyme and other biochemical changes; metabolic, gastro-intestinal, and hormonal disorders; histological changes; genetic and chromosomal effects; the pearl-change effect (related to orientation in bacteria and animals); and a miscellaneous group of symptoms that didn't fit into the above categories.

While it is clear that radiation that causes heating can also cause secondary effects, not all the effects listed above are heat-related. Indeed, much of the literature at the lower exposure levels is unrelated to heating. This is the type of research that helped regulators to formulate their microwave guidelines. The non-thermal studies have been ignored by the World Health Organization, upon which many countries look for guidance, and hence the guidelines differ by orders of magnitude from the lowest in Salzburg, Austria (0.1 microW/cm²) to the highest (5,000 microW/cm² for occupational exposure) established by ICNIRP (International Commission on Non-Ionizing Radiation). This is a 50,000 times difference!

One way to interpret this is that we have two guidelines, one to prevent heating and, a more restrictive guideline, to prevent biological effects, some of which can have serious health consequences.

What is striking is that what we used to call *microwave sickness* (group of symptoms associated with radar workers) has been called *neuroasthenia* (feeling unwell) and is now called *electrohypersensitivity*. In all cases the symptoms are associated with exposure to radio frequency radiation initially radar; then RF heat sealers and computers; and more recently various sources of wireless technology including mobile phone, broadcast, and WiFi or WiMax antennas, wireless routers, smart meters, etc.

The specific biological and health effects, provided in Glaser 1972, are listed below:

A. Heating of Organs* (Applications: Diathermy, Electrosurgery, Electrocoagulation, Electrodesiccation, Electrotomy)

This includes heating of the whole body or part of the body like the skin, bone and bone marrow, lens of the eye with cataracts and damage to the cornea; genitalia causing tubular degeneration of testicles; brains and sinuses; metal implants causing burns near hip pins etc. These effects are reversible except for damage to the eye.

B. Changes in Physiologic Function

This includes contraction of striated muscles; altered diameter of blood vessels (increased vascular elasticity), dilation; changes in oxidative processes in tissues and organs; liver enlargement; altered sensitivity to drugs; decreased spermatogenesis leading to decreased fertility and to sterility; altered sex ratio of births in favor of girls; altered menstrual activity; altered fetal development; decreased lactation in nursing mothers; reduction in diuresis resulting in sodium excretion via urine output; altered renal function; changes in conditioned reflexes; decreased electrical resistance of skin; changes in the structure of skin receptors; altered rate of blood flow; altered biocurrents in cerebral cortex in animals; changes in the rate of clearance of tagged ions from tissues; reversible structural changes in the cerebral cortex and diencephalon; changes in electrocardiographs; altered sensitivity to light, sound, and olfactory stimuli; functional and pathological changes in the eyes; myocardial necrosis; hemorrhage in lungs, liver, gut and brain and generalized degeneration of body tissue at fatal levels of radiation; loss of anatomical parts; death; dehydration; altered rate of tissue calcification.

C. Central Nervous System Effects

This includes headaches; insomnia; restlessness (daytime and during sleep); changes in brain wave activity (EEG); cranial nerve disorders; pyramidal tract lesions; disorders of conditioned reflexes; vagomimetic and sympathomimetic action of the heart; seizure and convulsions.

D. Autonomic Nervous System Effects

Altered heart rhythm; fatigue, structural alterations in synapses of the vagus nerve; stimulation of the parasympathetic nervous system leading to Bradycardia and inhibition of the sympathetic nervous system.

E. Peripheral Nervous System Effects

Effects on locomotor nerves.

F. Psychological Disorders

Symptoms include neurasthenia (general bad feeling); depression; impotence; anxiety; lack of concentration; hypochondria; dizziness; hallucinations; sleepiness or insomnia; irritability; decreased appetite; loss of memory; scalp sensations; fatigue; chest pain, tremors.

G. Behavioral Changes in Animals Studies

Effects include changes in reflexive, operant, avoidance and discrimination behaviors.

H. Blood Disorders

Effects include changes in blood and bone marrow; increased phagocytic and bactericidal functions; increased rate of hemolysis (shorter lifespan of cells); increased blood sedimentation rate; decreased erythrocytes; increased blood glucose concentrations; altered blood histamine content; changes in lipids and cholesterol; changes in Gamma Globulin and total protein concentration; changes in number of eosinophils; decrease in albumin/globulin ratio; altered hemopoiesis (rate of blood corpuscles formation); leukopenia (increased number of white blood cells and leukocytosis; reticulocytosis (increase in immature red blood cells).

I. Vascular Disorders

This includes thrombosis and hypertension.

J. Enzyme and Other Biochemical Changes (in vitro)

Changes in the activity of cholinesterase (also in vivo); phosphatase; transaminase; amylase, carboxydismutase; denaturation of proteins; inactivation of fungi, viruses, and bacteria; killed tissue cultures; altered rate of cell division; increased concentration of RNA in lymphocytes and decreased concentration of RNA in brain, liver and spleen; changes in pyruvic acid, lactic acid and creatinine excretions; changes in concentration of glycogen in liver (hyperglycemia); altered concentrations of 17-ketosteroids in urine.

K. Metabolic Disorders

Effects include glycosuria (sugar in urine); increase in urinary phenols; altered processing of metabolic enzymes; altered carbohydrate metabolism.

L. Gastro-Intestinal Disorders

Effects include anorexia; epigastric pain; constipation; altered secretion of stomach digestive juices.

M. Endocrine Gland Changes

Effects include altered functioning of pituitary gland, thyroid gland (hyperthyroidism and enlarged thyroid, increased uptake of radioactive iodine), and adrenal cortex; decreased corticosteroids in blood; decreased glucocorticoidal activity; hypogonadism (with decreased production of testosterone).

N. Histological Changes

Changes in tubular epithelium of testicles and gross changes.

O. Genetic and Chromosomal Changes

Effects include chromosomal aberrations (shortening, pseudochiasm, diploid structures, amitotic divisions, bridging, "stickiness"; irregularities in chromosomal envelope); mutations; mongolism; somatic alterations (not involving nucleus or chromosomes); neoplastic diseases (tumors).

P. Pearl Chain Effect

This refers to intracellular orientation of subcellular particles and orientation of cellular and other (non-biologic particles, i.e. mini magnetics) affecting orientation of animals, birds, and fish in electromagnetic fields.

Q. Miscellaneous Effects

These include sparking between dental fillings; metallic taste in mouth; changes in optical activity of colloidal solutions; treatment for syphilis, poliomyelitis, skin diseases; loss and brittleness of hair; sensations of buzzing, vibrations, pulsations, and tickling about head and ears; copious perspiration, salivation, and protrusion of tongue; changes in the operation of implanted cardiac pacemakers; changes in circadian rhythms.