Hardell L, Hansson Mild K, Carlberg M, Hallquist A, Påhlson A. Vestibular schwannoma, tinnitus and cellular telephones. *Neuroepidemiology* 2003; 22:124–129.

http://members.aol.com/phikent/orbit/new174.htm :

Microwave Hearing - abstracts, references

In no special order:

Auditory system response to RF energy. A.H. Frey, Aerospace Medecine, vol. 32, pp. 1140-1142, 1961.

Human Auditory System Response to Modulated Electromagnetic
Frey, Allan. J. Appl. Physiol. 17(4): 689-692. 1962.
http://www.raven1.net/frey.htm

Hearing Sensations in Electric Fields. Sommer, H.C. & von Gierke, H.E. Aerospace Medicine, pp 834-839, Sept. 1964.

Microwave hearing: Evidence for thermacoustic auditory stimulation by pulsed microwaves. K.R. Foster and E.D. Finch. Science, vol. 185, pp. 256-258, 1974.

Detection of weak electromagnetic radiation by the mammalian vestibulocochlear apparatus. Lebovitz R.M. N.Y. Acad. Sci. 247:182-193; 1975.

Microwave Auditory Effects and Applications. James C. Lin; Charles C. Thomas, Publisher, Springfield, IL, 1978; 221 pp.

Auditory perception of radio-frequency electromagnetic fields. Chou, C.K.; Guy, A.W.; Galambos, R. J Acoust Soc Am vol. 71(6), pp. 1321-1334, 1982.

~~~~~~~

The following 14 abstracts are from the NASA
Center for AeroSpace Information (CASI)
Technical Report Server -- Search page:

http://www.sti.nasa.gov/RECONselect.html

~~~~~~~

TITLE: The microwave auditory phenomenon

Authors: Lin, J. C. (Wayne State University)
Journal Title:
IEEE, Proceedings, vol. 68, Jan. 1980, p. 67-73.
Navy-NSF-supported research. http://www.eeisnet.com

Published: Jan 01, 1980

Abstract:
The paper examines electrophysiological activity produced by exposing the brains of laboratory animals to rectangular pulses of microwave energy. These results suggest that a microwave auditory phenomenon is evoked by a mechanism similar to conventional sound reception, and that the primary interaction site is peripheral to the cochlea. It is shown that the peak pressure due to thermal expansion is greater than the radiation pressure or electrostriction, and that the induced sound frequency is only a function of the size and acoustic property of the brain. Several suggestions were made for future research in microwave auditory effect and its health implications.

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TITLE: Sensation and perception of microwave energy

Authors: Michaelson, S. M. (Rochester Univ.)

Presented at the 7th Intern. Conf. on Environ. Toxicity: Fundamental and Applied Aspects of Nonionizing Radiation, Rochester, N. Y., 5 Jun. 1974
Sponsored by AEC and Dept. of Navy

Abstract:
Sensing or perception of microwave/radiofrequency energy is accomplished through various mechanisms. In mammals, the main phenomena of sensation or perception are those of thermal sensations and, in selected cases, audition. Thermal sensation is accomplished by stimulation of thermosensitive nerve endings in the skin. Although some investigators believe that hearing or audition is evidence of direct nerve stimulation, the most recent data show this phenomena to be due to electromechanically induced vibrations in tissue and normal reception in the cochlea of the ear.

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TITLE: On microwave-induced hearing sensation

Authors: Lin, J. C. (Wayne State University)
Journal Title:
IEEE Transactions on Microwave Theory and Techniques, vol. MTT-25, July 1977, p. 605-613. p. 605-613

Abstract:
When a human subject is exposed to pulsed microwave radiation, an audible sound occurs which appears to originate from within or immediately behind the head. Laboratory studies have also indicated that evoked auditory activities may be recorded from cats, chinchillas, and guinea pigs. Using a spherical model of the head, this paper analyzes a process by which microwave

energy may cause the observed effect. The problem is formulated in terms of thermoelasticity theory in which the absorbed microwave energy represents the volume heat source which depends on both space and time. The inhomogeneous thermoelastic motion equation is solved for the acoustic wave parameters under stress-free surface conditions using boundary value technique and Duhamel's theorem. Numerical results show that the predicted frequencies of vibration and threshold pressure amplitude agree reasonably well with experimental findings.

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TITLE: Absorption of millimeter waves by human beings and its biological implications

Authors: Gandhi, O. P. - Riazi, A. (Utah, University)
Journal Title:
IEEE Transactions on Microwave Theory and Techniques (ISSN 0018-9480), vol. MTT-34, Feb. 1986, p. 228-235. USAF-supported research. http://www.eeisnet.com

Abstract:
Aspects of the biological implications of millimeter wave radiation for human beings are discussed. The power densities likely to be encountered close to radiators in the 30-300 GHz frequency band are examined. The millimeter wave absorption efficiency of the human body with and without clothing is described, and the possibility of 90-95 percent coupling efficiency with clothing acting as an impedance matching transformer is addressed. The possibility of very high rates of energy deposition in the skin due to submillimeter depths of penetration is considered. The potential effect of millimeter wave absorption on human eyes, with particular emphasis on the cornea, in which high rates of energy deposition are encountered, are discussed. Hearing sensations produced by millimeter waves and thermal sensations by millimeter wave irradiation are addressed.

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TITLE: Electrophysiological effects of electromagnetic fields on animals

Authors:
Guy, A. W. (Washington Univ.) - Lin, J. C. (Washington Univ.) - Chou, C. K. (Washington Univ.)

Presented at the 7th Rochester Intern. Conf. on Environ. Toxicity, Rochester, NY Jun. 1974

Abstract:
The report shows that the conduction and transmission latencies

and amplitudes of evoked potentials in both the CNS of anesthetized cats, isolated nerves of cats, and ganglia of rabbits are affected by CW microwaves in a manner very similar to that of localized conduction heat. Temperature rises are always associated with any observable changes of the measured characteristics in the nervous tissues exposed to CW irradiation. Electrophysiological studies on cats indicate that pulsed microwaves interact with mammalian auditory systems in a manner similar to that of conventional acoustic perception. A possible mechanism of microwave interaction is the acoustic energy release from rapid thermal expansion due to power absorption in the gross structure of the head.

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TITLE: Investigation of the characteristics of auditory effects stimulated by microwaves using a spherical model

Authors:
Shorokhov, V. V. - Tigranian, R. E. - Mashkin, P. V. (AN SSSR)

Journal Title:
Biofizika (ISSN 0006-3029), vol. 31, July-Aug. 1986, p. 695-700. In Russian.

Abstract:
The features of sound waves excited by microwave impulses (at 915 and 2375 MHz) were studied, using spherical flasks filled with ethanol or 0.1 M NaCl in water as models of the human head. A piezoceramic transducer was used to register mechanical oscillations of the flask's surface. The results suggest that the auditory effects of microwaves are caused by stimulation of mechanical oscillations in the liquid (or the head tissues) by electromagnetic energy, followed by the bone-effected transfer of the absorbed energy to the auditory organs.

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TITLE: Auditory perception of radio-frequency electromagnetic fields

Authors:
Chou, C.-K. - Guy, A. W. (Washington, University) - Galambos, R. (California, University)

Journal Title:
Acoustical Society of America, Journal, vol. 71, June 1982, p. 1321-1334. U.S. Department of Education

Abstract:
Absorption of pulsed microwave energy can produce an auditory sensation in human beings with normal hearing. The phenomenon

manifests itself as a clicking, buzzing, or hissing sound depending on the modulatory characteristics of the microwaves. While the energy absorbed and the resulting increment of temperature per pulse at the threshold of perception are small, most investigators of the phenomenon believe that it is caused by thermoelastic expansion. In this paper, literature that describes psychological, behavioral, and physiological observations as well as physical measurements pertinent to the microwave-hearing phenomenon is reviewed.

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TITLE: Microwave induced acoustic effects in mammalian auditory systems

Authors:
Guy, A. W. (Washington Univ.) - Chou, C. K. (Washington Univ.)

Journal Title:
AGARD Radiation Hazards - Page: 17 p, Aug 01, 1975

Abstract:
Pulsed microwave fields with incident energy densities of 20 to 40 micro Joule per sq cm per pulse will produce responses in the auditory system of man and animals similar to those produced by auditory stimuli. Recent studies indicate that the responses may be originated from high frequency vibrations induced in the head of the exposed subject by a transient thermal expansion of tissue due to the rapid absorption of the pulsed microwave energy.

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TITLE: Effects of electromagnetic fields on the nervous system

Authors:
Chou, C. K. (Washington Univ.) - Guy, A. W. (Washington Univ.)

Published: Aug 01, 1975

Abstract:
Contents: Electromagnetic Field-Biomaterial Interaction and Methods of Measurement; Effects of Electromagnetic Fields on Isolated Nerves and Superior Cervical Ganglia: Design of Waveguide Apparatus, and Calculation of Specific Absorption Rate; Effects of Electromagnetic Fields on Muscle Contraction; Effects of Electromagnetic Fields on Auditory System: Effect of Noise Masking on Threshold of Evoked Auditory Responses, Microwave-induced Cochlear Microphonics in Guinea Pigs.

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TITLE: Theoretical calculation of frequencies and thresholds of microwave-induced auditory signals

Authors: Lin, J. C. (Wayne State University)

(International Union of Radio Science, Annual Meeting, Amherst, Mass., Oct. 11-15, 1976.) Radio Science, vol. 12, Nov.-Dec. 1977, Supplement, p. 237-242.

Abstract:
Previously developed thermoelastic models of microwave-induced auditory sensations are applied to calculate the frequency and amplitude of the acoustic signals that are generated in human beings and laboratory animals. Graphs of computed displacement and pressure as a function of time are presented for several species.

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TITLE: Quantitation of microwave biological effects

Authors:
Chou, C. K. (Washington Univ.) - Guy, A. W. (Washington Univ.)

Journal Title:
Bur. of Radiol. Health Symp. on Biol. Effects and Meas. of Radio Freq./Microwaves - Page: p 81-103

Abstract:
While emphasizing dosimetry and instrumentation, we have been able to demonstrate that the effects of acute exposure to CW microwaves on some of the electrophysiological properties of the nervous system are thermal in nature. Studies on the microwave auditory effect have provided strong evidence that the mechanism of microwave hearing is electromechanical in nature. Development of a chronic exposure system and carbon EEG electrodes will provide a means for other researchers in pursuing the studies of biological effects of low level chronic exposure of microwaves. In this reported research, the quantitation of microwave biological effects is stressed so that extrapolation to humans is possible.

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TITLE: Vestibulo-cochlear single unit responses to microwave radiation

Authors:
Lebovitz, R. M. (Texas Univ. Health Science Center) -
Seaman, R. L. (Texas Univ. Health Science Center)

Journal Title:
Bur. Radiol. Health Symp. on Biol. Effects and Meas. of Radio Freq./Microwaves - Page 314-333

Abstract:
The influence of microwave radiation (MWR) on functional neuronal properties was examined, and the effects of continuous wave MWR on units of the vestibular system were studied. The threshold for this effect appeared to be above the current standards for safe exposure; above a level for significant intracranial thermogenesis. The response of single auditory units to pulse modulated MWR were studied. Pulse parameters rather than average power density appeared to be the independent variable for this effect and responses were observed at pulse energy densities of 4 mvon J/g and lower. Overall, the response of a given single auditory unit to pulsed MWR was similar to its response to traditional acoustic click stimuli.

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TITLE: Auditory unit responses to single-pulse and twin-pulse microwave stimuli.

Authors: Seaman RL; Lebovitz RM

Source: Hear Res; VOL 26, ISS 1, 1987, P105-16

Abstract:
Responses of units in the cat cochlear nucleus to single microwave pulses with different durations and to twin microwave pulses with different interpulse delays are used to study microwave hearing. Inferred threshold specific absorption rate is less than 6 mW/g; inferred threshold specific absorption, less than 0.5 microJ/g. The existence of responses from units with characteristic frequencies (CFs) from 931 Hz to 25.5 kHz is not consistent with a primary role for head resonance in microwave hearing. Patterns of response amplitude have a periodicity of 1/CF and are fully explained by frequency content of the pulse stimulus and signal processing of the auditory system. For pulses shorter than about 0.24/CF, it is shown that response amplitude is predictably proportional to pulse energy.

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TITLE: Effects of low power microwaves on the local cerebral blood flow of conscious rats

Authors: Oscar, K. J. (Army Mobility Equipment Command)

Published: Jun 01, 1980

Corporate Source:
Army Mobility Equipment Command (Fort Belvoir, VA, United States)

Abstract:
A decoy and deception concept presently being considered is to remotely create the perception of noise in the heads of personnel by exposing them to low power, pulsed microwaves. When people are illuminated with properly modulated low power microwaves the sensation is reported as a buzzing, clicking, or hissing which seems to originate (regardless of the person's position in the field) within or just behind the head. The phenomena occurs at average power densities as low as microwatts per square centimeter with carrier frequencies from 0.4 to 3.0 GHz. By proper choice of pulse characteristics, intelligible speech may be created. Before this technique may be extended and used for military applications, an understanding of the basic principles must be developed. Such an understanding is not only required to optimize the use of the concept for camouflage, decoy and deception operations but is required to properly assess safety factors of such microwave exposure.

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TITLE: Radiation hazard assessment of pulsed microwave radars.

Authors: Puranen L; Jokela K; Finnish Centre for Radiation and Nuclear Safety, Helsinki, Finland.

Source: J Microw Power Electromagn Energy, 31(3):165-77 1996

Abstract:
Observed biological effects of pulsed microwave radiation are reviewed and the exposure standards for microwave radiation are summarized. The review indicates that the microwave auditory effect is the only well-established specific effect in realistic exposure situations. The threshold for the effect depends on the energy density per pulse and may be as low as 20 mJ/m2 for people with low hearing threshold. Energy density limits have been included in the most recent exposure for measurements of pulse power densities around scanning radar antennas is described, and a simple new model for the calculation of power density in the main beam of radar antennas is presented. In the near field measured values differed from the calculated values by 2-3 dB.

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http://es.epa.gov/ncerqa_abstracts/sbir/other/monana/kohn.html

Communicating Via the Microwave Auditory Effect

An innovative and revolutionary technology is described that offers a means of low-probability-of-intercept Radio frequency (RF) communications. The feasibility of the concept has been established using both a low intensity laboratory system and a high power RF transmitter. Numerous military applications exist in areas of search and rescue, security and special operations.

Awarding Agency: Department of Defense
SBIR Contract Number: F41624-95-C-9007
Title: Communicating Via the Microwave Auditory Effect
Principal Investigator: Mr. Brian Kohn
Company Name:
Science & Engineering Assoc, Inc.
6100 Uptown Blvd NE
Albuquerque, NM 87110
Telephone Number: 505-884-2300
Business Representative:
Project Period:
Project Amount: $739,995
Research Category: Monitoring/Analytical

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HEARING DEVICE

United States Patent: 4,858,612 ; Aug. 22, 1989

Inventors: Stocklin; Philip L.

ABSTRACT:

A method and apparatus for simulation of hearing in mammals by introduction of a plurality of microwaves into the region of the auditory cortex is shown and described. A microphone is used to transform sound signals into electrical signals which are in turn analyzed and processed to provide controls for generating a plurality of microwave signals at different frequencies. The multifrequency microwaves are then applied to the brain in the region of the auditory cortex. By this method sounds are perceived by the mammal which are representative of the original sound received by the microphone.

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from:
http://mercury.spaceports.com/~persewen/fritzchapter6.htm

The Illuminati Formula Used to Create an
Undetectable Total Mind Controlled Slave.

by Cisco Wheeler and Fritz Springmeier

CHAPTER 6. -- SCIENCE
THE USE OF ELECTRONICS & ELECTRICITY

MICROWAVES FOR PROGRAMMING

On Aug. 22, 1989, Phillip L. Stocklin, P.O. Box 2111, Satellite Beach, FL took out a patent -- which is Patent Number 4,858,612 which is a device that can be placed in the auditory cortex of the brain. This device allows the following process: someone speaks into a microphone, the microphone then has its sounds coded into microwave, which are sent to the receiver in the brain and the receiver device will transform the microwaves back so that the person's mind hears the original sounds. In other words, a person with this device in their head will hear whatever the programmers send via microwave signals.

HEARING DEVICE

BACKGROUND OF THE INVENTION

1. Field at the Invention

This invention relates to devices for aiding at hearing in mammals. The invention is based upon the perception at sounds which is experienced in the brain when the brain is subjected to certain microwave radiation signals.

2. Description ot the Prior Art

In prior art hearing devices for human beings, it is well known to amplify sounds to be heard and to apply the amplified sound signal to the ear at the person wearing the hearing aid. Hearing devices of this type are however limited to hearing disfunctions where there is no damage to the auditory nerve or to the auditory cortex. In the prior art, if there is damage to the auditory cortex or the auditory nerve, it cannot be corrected by the use ot a hearing aid. During World War II, individuals in the radiation path of certain radar installations observed clicks and buzzing sounds in response to the microwave radiation. It was through this early observation that it became known to the art that microwaves could cause a direct perception at sound within a human brain.

These buzzing or clicking sounds however were not meaningful and were not perception of sounds which could otherwise be heard by the receiver. This type of microwave radiation was not representative of any intelligible sound to be perceived. In such radar installations, there was never a sound which was generated which resulted in subsequent generation of microwave signals representative of that sound. Since the early perception of buzzing

and clicking. further research has been conducted into the micro-wave reaction of the brain. In an article entitled Possible Microwave Mechanisms of the Mammalian Nervous System" by Philip L Stocklin and Brain F. Stocklin, published in the TIT Journal of Life Sciences. Tower International Technomedical Institute. Inc. P.O. Box 4594, Philadelphia. Pa. (1979) there is disclosed a hypothesis that the mammalian brain generates and uses electro magnetic waves in the lower microwave frequency region as an integral part of the functioning of the central and peripheral nervous systems. This analysis is based primarily upon the potential energy of a protein integral in the neural membrane. In an article by W. Bise entitled "Low Power Radio-Frequency and Microwave Effects On Human Electro- encephalogram and Behavior," Physiol. Chemistry Phys. 10. 387 (1978), it is reported that there are significant effects upon the alert human EEG during radiation by low intensity cw microwave electromagnetic energy. Bise observed significant repeatable EEG effects tar a subject during radiation at specific microwave frequencies.

SUMMARY OF THE INVENTION

Results at theoretical analysis of the physics ot brain tissue and the brain/skull cavity, combined with experimentally-determined electromagnetic properties at mammalian brain tissue, indicate the physical necessity for the existence of electromagnetic standing waves. called modes in the living mammalian brain. The made characteristics rnay be determined by two geometric properties at the brain: these are the cephalic index at the brain (its shape in prolate spheroidal coordinates) and the semifocal distance of the brain (a measure of its size). It was concluded that estimation ot brain cephalic index and semifocal distance using external skull measurements on subjects permits estimation of the subjects characteristic mode frequencies, which in turn will permit a mode by mode treatment at the data to simulate hearing.

This invention provides for sound perception by individuals who have impaired hearing resulting tram ear damage, auditory nerve damage, and damage to the auditory cortex. This invention provides for simulation of microwave radiation which is normally produced by the auditory cortex. The simulated brain waves are introduced into the region at the auditory cortex and provide for perceived sounds on the part at the subject.

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CRITIQUE OF THE LITERATURE ON BIOEFFECTS OF RADIOFREQUENCY RADIATION: A COMPREHENSIVE REVIEW PERTINENT TO AIR FORCE OPERATIONS.

Final Report USAFSAM-TR-87-3 (June 1987)

Contents:
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http://www.brooks.af.mil/AFRL/HED/hedr/reports/bioeffects/87-3con.htm

3.1.4.2 AUDITORY EFFECTS (Large - 84 KB)

http://www.brooks.af.mil/AFRL/HED/hedr/reports/bioeffects/3-1-4-2.htm

Humans near some types of pulsed radar systems have perceived individual pulses of RFR as audible clicks (without use of electronic receptors). This phenomenon, first investigated by Frey (1961), attracted much interest because it has been cited often as evidence that nonthermal effects can occur and because an initial hypothesis was that a possible mechanism for perception is direct stimulation of the central nervous system by RFR.

REFERENCES:

Cain, C.A. and W.J. Rissman
MAMMALIAN AUDITORY RESPONSES TO 3.0 GHz MICROWAVE PULSES
IEEE Trans. Biomed. Eng., Vol. 25, No. 3, pp. 288-293 (1978)
http://www.eeisnet.com

Chou, C.-K., R. Galambos, A.W. Guy, and R.H. Lovely
COCHLEAR MICROPHONICS GENERATED BY MICROWAVE PULSES
J. Microwave Power, Vol. 10, No. 4, pp. 361-367 (1975)

Chou, C.-K., A.W. Guy, and R. Galambos
CHARACTERISTICS OF MICROWAVE-INDUCED COCHLEAR MICROPHONICS
Radio Sci., Vol. 12, No. 6S, pp. 221-227 (1977)

Chou, C.-K. and R. Galambos
MIDDLE-EAR STRUCTURES CONTRIBUTE LITTLE TO AUDITORY PERCEPTION OF MICROWAVES
J. Microwave Power, Vol. 14, No. 4, pp. 321-326 (1979)

Chou, C.-K. and A.W. Guy
CARBON-LOADED TEFLON ELECTRODES FOR CHRONIC EEG RECORDINGS IN MICROWAVE RESEARCH
J. Microwave Power, Vol. 14, No. 4, pp. 399-404 (1979a)

Chou, C.-K., and A.W. Guy
MICROWAVE-INDUCED AUDITORY RESPONSES IN GUINEA PIGS: RELATIONSHIP OF THRESHOLD AND MICROWAVE-PULSE DURATION
Radio Sci., Vol. 14, No. 6S, pp. 193-197 (1979b)

Chou, C.-K., A.W. Guy, K.R. Foster, R. Galambos, and D.R. Justesen
HOLOGRAPHIC ASSESSMENT OF MICROWAVE HEARING
Science, Vol. 209, pp. 1143-1144 (5 Sept 1980a)

Chou, C.-K., K.-C. Yee, and A.W. Guy
AUDITORY RESPONSE IN RATS EXPOSED TO 2,450 MHZ ELECTROMAGNETIC

WAVES IN A CIRCULARLY POLARIZED WAVEGUIDE
Bioelectromagnetics, Vol. 6, No. 3, pp. 323-326 (1985a)

Foster, K.R. and E.D. Finch
MICROWAVE HEARING: EVIDENCE FOR THERMOACOUSTIC AUDITORY STIMULATION BY PULSED MICROWAVES
Science, Vol. 185, pp. 256-258 (19 July 1974)

Frey, A.H.
AUDITORY SYSTEM RESPONSE TO RADIO-FREQUENCY ENERGY
Aerospace Med., Vol. 32, pp. 1140-1142 (1961)

Frey, A.H.
HUMAN AUDITORY SYSTEM RESPONSE TO MODULATED ELECTROMAGNETIC ENERGY
J. Appl. Physiol., Vol. 17, No. 4, pp. 689-692 (1962)

Frey, A.H.
MAIN STEM EVOKED RESPONSES ASSOCIATED WITH LOW-INTENSITY PULSED UHF ENERGY
J. Appl. Physiol., Vol. 23, No. 6, pp. 984-988 (1967)

Frey, A.H. and R. Messenger, Jr.
HUMAN PERCEPTION OF ILLUMINATION WITH PULSED ULTRAHIGH-FREQUENCY ELECTROMAGNETIC ENERGY
Science, Vol. 181, pp. 356-358 (27 July 1973)

Frey, A.H. and E. Coren
HOLOGRAPHIC ASSESSMENT OF A HYPOTHESIZED MICROWAVE HEARING MECHANISM
Science, Vol. 206, pp. 232-234 (12 Oct 1979)

Frey, A.H. and E. Coren
HOLOGRAPHIC ASSESSMENT OF MICROWAVE HEARING [A response]
Science, Vol. 209, pp. 1144-1145 (5 Sept 1980)

Guy, A.W.
ANALYSIS OF ELECTROMAGNETIC FIELDS INDUCED IN BIOLOGICAL TISSUES BY THERMOGRAPHIC STUDIES ON EQUIVALENT PHANTOM MODELS
IEEE Trans. Microwave Theory Tech., Vol. 19, No. 2, pp. 205-214
(1971) http://www.eeisnet.com

Guy, A.W., C.-K. Chou, J.C. Lin, and D. Christensen
MICROWAVE-INDUCED ACOUSTIC EFFECTS IN MAMMALIAN AUDITORY SYSTEMS AND PHYSICAL MATERIALS
Ann. N.Y. Acad. Sci., Vol 247, pp. 194-218 (1975b)

Guy, A.W., J. Wallace, and J. McDougall
CIRCULARLY POLARIZED 2450 MHZ WAVEGUIDE SYSTEM FOR CHRONIC EXPOSURE OF SMALL ANIMALS TO MICROWAVES
Radio Sci., Vol. 14, No. 6S, pp. 63-74 (1979)

Johnson, C.C. and A.W. Guy
NONIONIZING ELECTROMAGNETIC WAVE EFFECTS IN BIOLOGICAL MATERIALS AND SYSTEMS
Proc. IEEE, Vol. 60, No. 6, pp. 692-718 (1972)

Lebovitz, R.M. and R.L. Seaman
MICROWAVE HEARING: THE RESPONSE OF SINGLE AUDITORY NEURONS IN THE CAT TO PULSED MICROWAVE RADIATION

Radio Sci., Vol. 12, No. 6S, pp. 229-236 (1977)

Lin, J.C.
MICROWAVE AUDITORY EFFECT--A COMPARISON OF SOME POSSIBLE TRANSDUCTION MECHANISMS
J. Microwave Power, Vol. 11, No. 1, pp. 77-81 (1976a)

Lin, J.C.
MICROWAVE-INDUCED HEARING: SOME PRELIMINARY THEORETICAL OBSERVATIONS
J. Microwave Power, Vol. 11, No. 3, pp. 295-298 (1976b)

Lin, J.C.
ON MICROWAVE-INDUCED HEARING SENSATION
IEEE Trans. Microwave Theory Tech., Vol. 25, No. 7, pp. 605-613 (1977a) http://www.eeisnet.com

Lin, J.C.
FURTHER STUDIES ON THE MICROWAVE AUDITORY EFFECT
IEEE Trans. Microwave Theory Tech., Vol. 25, No. 7, pp. 938-943 (1977b) http://www.eeisnet.com

Lin, J.C.
THEORETICAL CALCULATION OF FREQUENCIES AND THRESHOLDS OF MICROWAVE-INDUCED AUDITORY SIGNALS
Radio Sci., Vol. 12, No. 6S, pp. 237-242 (1977c)

Lin, J.C.
MICROWAVE AUDITORY EFFECTS AND APPLICATIONS
Charles C. Thomas, Springfield, IL, p. 108 (1978)

Lin, J.C., R.J. Meltzer, and F.K. Redding
MICROWAVE-EVOKED BRAINSTEM POTENTIALS IN CATS
J. Microwave Power, Vol. 14, No. 3, pp. 291-296 (1979b)

Olsen, R.G. and W.C. Hammer
MICROWAVE-INDUCED PRESSURE WAVES IN A MODEL OF MUSCLE TISSUE
Bioelectromagnetics, Vol. 1, No. 1, pp. 45-54 (1980)

Olsen, R.G. and W.C. Hammer
EVIDENCE FOR MICROWAVE-INDUCED ACOUSTICAL RESONANCES IN BIOLOGICAL MATERIAL
J. Microwave Power, Vol. 16, Nos. 3 & 4, pp. 263-269 (1981)

Olsen, R.G. and J.C. Lin
MICROWAVE PULSE-INDUCED ACOUSTIC RESONANCES IN SPHERICAL HEAD MODELS
IEEE Trans. Microwave Theory Tech., Vol. 29, No. 10, pp. 1114-1117 (1981) http://www.eeisnet.com

Olsen, R.G. and J.C. Lin
MICROWAVE-INDUCED PRESSURE WAVES IN MAMMALIAN BRAINS
IEEE Trans. Biomed. Eng., Vol. 30, No. 5, pp. 289-294 (1983) http://www.eeisnet.com

Sharp, J.C., H.M. Grove, and O.P. Gandhi
GENERATION OF ACOUSTIC SIGNALS BY PULSED MICROWAVE ENERGY
IEEE Trans. Microwave Theory Tech., Vol. 22, No. 5, pp. 583-584 (1974) http://www.eeisnet.com

Taylor, E.M. and B.T. Ashleman
ANALYSIS OF CENTRAL NERVOUS SYSTEM INVOLVEMENT IN THE MICROWAVE AUDITORY EFFECT
Brain Res., Vol. 74, pp. 201-208 (1974)

Tyazhelov, V.V., R.E. Tigranian, E.O. Khizhniak, and I.G. Akoev
SOME PECULIARITIES OF AUDITORY SENSATIONS EVOKED BY PULSED MICROWAVE FIELDS
Radio Sci., Vol. 14, No. 6S, pp. 259-263 (1979)

White, R.M.
GENERATION OF ELASTIC WAVES BY TRANSIENT SURFACE HEATING
J. Appl. Phys., Vol. 34, No. 12, pp. 3559-3567 (1963)

Wilson, B.S., J.M. Zook, W.T. Joines, and J.H. Casseday

ALTERATIONS IN ACTIVITY AT AUDITORY NUCLEI OF THE RAT INDUCED BY EXPOSURE TO MICROWAVE RADIATION:
AUTORADIOGRAPHIC EVIDENCE USING [C-14] 2-DEOXY-D-GLUCOSE
Brain Res., Vol. 187, pp. 291-306 (1980)

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HUMAN EXPOSURE TO RADIOFREQUENCY RADIATION: A COMPREHENSIVE REVIEW PERTINENT TO AIR FORCE OPERATIONS

Air Force Research Laboratory, AL/OE-TR-1996-0035, 30 June 1994

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http://www.brooks.af.mil/AFRL/HED/hedr/reports/human_exposure/humtoc.html

3.1 THE RFR-AUDITORY EFFECT

http://www.brooks.af.mil/AFRL/HED/hedr/reports/human_exposure/htmlfile13.html#3.1

3.1.2 CONCLUSIONS

From a variety of studies of the RFR-auditory effect in humans, [Frey (1961, 1962), White (1963), Frey and Messenger (1973), Foster and Finch (1974), Sharp et al. (1974), Guy et al. (1975b), Lin (1977c), Cain and Rissman (1978)], considerable understanding has been achieved about the interaction mechanisms that give rise to the effect. The book by Lin (1978) presents detailed discussions of the various mechanisms that had been proposed for the effect, and the experimental evidence that supports the theory that the effect is due to induction thermoelastic waves by RFR pulses at a boundary between tissues of dissimilar dielectric properties within the head, with propagation of the waves to the auditory system. Noteworthy are the findings of several studies that persons with specific hearing impairments are unable to perceive RFR pulses; the finding of Foster and Finch (1974) that the effect does not occur in water at 4_C, where its thermal expansion coefficient is zero;
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and the peak-energy-density and peak-power-density thresholds for perception determined by Guy et al. (1975b) and Cain and Rissman (1978). [A peak power density of 300 mW/cm_ is taken as the nominal perception threshold for humans of RFR pulses 10 ¦s or longer.]

However, the subsequent unusual findings of Tyazhelov et al. (1979) may indicate that specific aspects of the phenomenon are worth further study. On the other hand, it is noteworthy that Cain and Rissman (1978) had exposed human volunteers to pulses of 3.0-GHz RFR at peak power densities as high as 2,500 mW/cm_ with no apparent ill effects. Thus, it is unlikely that persons perceiving RFR pulses would be affected adversely.

References:
http://www.brooks.af.mil/AFRL/HED/hedr/reports/human_exposure/humref.html

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from:

Mind Control
By Harry V. Martin and David Caul
From the Napa Sentinel, Napa, CA, USA

http://www.trufax.org/trans/napa.html

Thirty years ago, Allen Frey discovered that microwaves of 300 to 3000 megahertz could be "heard" by people, even if they were deaf, if pulsed at a certain rate. Appearing to be originating just in back of the head, the sound boomed, clicked, hissed or buzzed, depending upon the frequency. Later research has shown that the perception of the waves take place just in front of the ears. The microwaves causes pressure waves in the brain tissue, and this phenomenon vibrates the sound receptors in the inner ear through the bone structure. Some microwaves are capable of directly stimulating the nerve cells of the auditory pathways. This has been confirmed with experiments with rats, in which the sound registers 120 decibels, which is equal to the volume of a nearby jet during takeoff.

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from:

SOME ASPECTS OF ANTI PERSONNEL ELECTROMAGNETIC WEAPONS
David G. Guyatt Freelance Writer/Researcher

Synopsis prepared for the ICRC Symposium
THE MEDICAL PROFESSION AND THE EFFECTS OF WEAPONS
February 1996

http://www.copi.com/Articles/MK_FITB.rtf

Drs Joseph Sharp and Allen Frey experimented with microwaves

seeking to transmit spoken words directly into the audio cortex via a pulsed-microwave analog of the speaker's sound vibration. Indeed, Frey's work in this field, dating back to 1960 gave rise to the so called "Frey effect" which is now more commonly referred to as "microwave hearing."19 Within the Pentagon this ability is now known as "Artificial Telepathy".20 Adey and others have compiled an entire library of frequencies and pulsation rates which can effect the mind and nervous system.

19 In this connection the work of Dr. James Lin of Wayne State University should be noted. Lin has written a book entitled "Microwave Auditory Effects & Applications" in which he states "The capability of communicating directly with humans by pulsed microwaves is obviously not limited to the field of therapeutic medicine."

20 Refer to Dr. Robert Becker who has stated "Such a device has obvious applications in covert operations designed to drive a target crazy with "voices" or deliver undetected instructions to a programmed assassin." In 1974 Dr J F Scapitz filed a plan to explore the interaction of radio signals and hypnosis. He stated that "In this investigation it will be shown that the spoken word of the hypnotists may be conveyed by modulate electromagnetic energy directly into the subconscious parts of the human brain -- i.e. without employing any technical devices for receiving or transcoding the messages and without the person exposed to such influence having a chance to control the information input consciously." Schapitz' work was funded by the DoD. Despite FOIA filings his work has never been made available. Also it is interesting to note the date of 1974, which almost exactly mirror's the period when the USSR commenced its own programme that resulted in "Acoustic Psycho-correction technology."

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Microwaves and Behavior
Dr. Don R. Justesen
American Psychologist, Journal of the American Psychological Association, Volume 30, March 1975, Number 3

Page 396:

The demonstration of sonic transduction of microwave energy by materials lacking in water LESSENS the likelihood that a thermohydraulic principle is operating in human perception of the energy. Nonetheless, some form of thermoacoustic transduction probably underlies perception. If so, it is clear that simple heating is NOT a sufficient basis for the Frey effect; the requirement for pulsing of radiations appears to implicate a thermodynamic principle.

Frey and Messenger (1973) and Guy, Chou, Lin, and Christensen (1975) confirmed that a microwave pulse with a slow rise time is INeffective in producing an auditory response; only
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if the rise time is SHORT, resulting in effect in a square wave with respect to the leading edge of the envelope of radiated radio-frequency energy, does the auditory response occur.

from:
http://www.raven1.net/v2succes.htm

"In een recent onderzoek is ook geconstateerd dat na 10 minuten bellen het bloed bij het oor op een speciale manier gaat klonteren, en dat dit 10 minuten na het telefoneren nog zichtbaar is. Persoonlijk leg ik dan een link met het ruisen waar nogal wat mensen last van hebben, wat kan worden veroorzaakt door een verminderde doorbloeding van het gehoororgaan."