SOME POINTS I BELIEVE THE STUDY PANEL ON SMART METERS SHOULD CONSIDER

1. **To begin, I strongly recommend that each member of the CCST panel take a little time to watch online a presentation about smart meters and health, made in September by physician and biomedical engineer Karl Maret. He discusses, giving graphic examples, evidence supporting biological interactions resulting from exposure to low-intensity, high-frequency radio/microwave pulse-modulated fields (other than thermal effects). Dr. Maret's presentation can be found at http://www.communitytv.org/programs/online/truth-about-smart-meters . (beginning at 23:40 on the video telecast). In addition to many specific scientific points, Dr. Maret speaks of the relevance of the precautionary principle with regard to the smart meters. If the panel members identify any items within the Doctor's presentation that interest them / are relevant to their report, I can very quickly get to them whatever additional background or documentation they may require.**

2. In claiming that the RF exposures from their smart meter program is well below FCC limits, PG&E (and the CPUC) ignore the facts that those limits were set many years ago, when there had been considerably less research conducted on bioactivity of RF/microwave exposures. Those limits were based solely on damage that could occur to the body by way of thermal effects; yet there have been many thousands of scientific studies that indicate bioactivity of pulsed exposures at levels below those that create tissue heating. A large number of these studies suggest the possibility of DNA disruptions and neurological and other harm resulting from such low-level exposures. References to such studies are available upon request. A small subset of such studies are referenced at the end of this document; others are referenced in the letter from physicians regarding smart meters, being sent along with this document.

   According to the EPA itself , “the FCC’s current exposure guidelines…are thermally based, and do not apply to chronic, nonthermal exposure situations… Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified…There are studies [of chronic or prolonged low-level exposure] that suggest that potentially adverse health effects, such as cancer, may occur.” [United States Environmental Protection Agency, 7/16/02]

3. No pilot studies were conducted to determine the exposures resulting from PG&E’s unique “mesh network” system functioning in-situ. That is, PG&E claims that each meter transmits information only once an hour (or every 4 hours, depending on which PG&E source of information is to be believed) for residential installations, and every 15 minutes for commercial installations. But these numbers actually only refer to the frequency with which each

property's installation is polled for its own data; in fact, the system is designed so that each meter actually pulses typically once a minute or even more frequently (in each instance producing RF radiation), due to each meter repeating the signals from all the neighboring meters. A number of trained, experienced electrical engineers or electrical contractors have tested PG&E's meters in the field, in many different parts of PG&E's service territory, and they in every case found pulses averaging this much greater frequency. In fact, one of the top executives of PG&E's smart meter program acknowledged to me recently that their meters "chirp" (i.e., pulse) nearly constantly.

PG&E claims that exposures from their meters are much less than for a typical cell phone. However, not only do their figures ignore the much more frequent pulsing that an actual system in operation generates (as described in 2. above). In addition, all their figures are based on time-averaged exposures, which in this case are not relevant because it is the intensity of the pulses themselves that presents the potential health problems. As an analogy, with time-averaging, one could be take a nail gun, fire it twice during a minute, and average that velocity and impact together with all the seconds when the nail gun wasn't firing. The result would be a junk number.

PG&E has been unwilling to disclose the actual **peak** power intensity for its various pieces of equipment (electric meter, gas meter transmitting module, streetside data collection unit, zigbee 2nd transmitter in each electric meter to be used to transmit to and from the HAN coordinating various appliances in the home, etc. And then there is the radiation generated by the wireless router inside each property necessary to make the HAN operate, and by each of the upgraded appliances. Preliminary in-the-field testing suggests that it may well be these peak radiated power emissions from each pulse that—over time—are creating neurological and other symptoms in vulnerable people. If that turns out to be the case, relying strictly on time-averaged data can obscure the actual risk factors from PG&E's technology and the way the company's infrastructure is organized.

4. PG&E's (and its technical consultant's) analysis further ignores the impact of the typical installation pattern for multi-unit buildings—i.e., having 10-30 meters lined up side-by-side along one wall, all chirping back and forth with the data from their own units and all the others in the complex. What is the exposure impact of having a child's head in a bed just on the other side of the wall containing all these contiguous meters? Has PG&E ever tested this in the field, for actual installations. I believe the answer is no.

5. PG&E further does not consider cumulative damage or sensitization that could develop due to both, over time, the operation of this entire system 24/7 systemwide, and the multiple layers of radiation to which members of the public are exposed, in many cases without their informed consent. The latter exposures can include from cellular antennas, ambient exposures from being in proximity to many people using cell phones in enclosed spaces (perhaps

with signals automatically boosted to increase reception), being in the increasing number of environments that have operating wi-fi (including more and more airplane flights), parallel AMI sytems for water meters, and the forthcoming super-wifi systems that will soon be ubiquitous utilizing the TV band white spaces that the FCC has just release for auction. (This latter is particularly analogous to AMI in that exposure will be compulsory and ubiquitous, with no means of escape even if one has already been diagnosed as having the recognized ADA disability known as "electrical hypersensitivity".)

6. PG&E and the CPUC have never arranged for an independent long-term study of possible negative health consequences from the installation and operation of its mesh network AMI system (which itself was only approved by the CPUC in 2009. At the time the original AMI application was approved in 2006, the original authorization stated that the project was exempt from CEQA due to a technicality in the CEQA regulations, namely the exception "in either or both CEQA Guideline § 15301(b), for existing facilities of public utilities, and § 15302(c) for the replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity." At the time these CEQA regulations were created, utility systems emtting RF radiation was not considered by the legislature nor the regulating bodies. I am not certain whether a similar technical exception was made in early 2009 when PG&E changed its application to one for the mesh network system, but am certain that potential harms to the health of the public or the environment was not considered.

7. Concerned members of the public have repeatedly raised the above concerns and questions directly with PG&E Corp. President Darbee and his top Smart Meter program lieutenants, and in all cases they were promised that answers would be quickly forthcoming. Many months have gone by, and the silence form PG&E has been deafening. The same is true of CPUC President Peevey and his staff, with whom the same issues were raised numerous times. Instead, these relevant questions and concerns from the public have been ignored while the AMI installations continue.

8. In addition to the exposures described above, in many cases an electric AMI installation also adds high-frequency pulses to the building's own AC wiring. This is known as "dirty electricity", and itself tends to generate and amplify the very range of systems that smart meters are causing through direct ambient exposure. This phenomenon is well-described in the new book by Dr. Samuel Milham entitled *Dirty Electricity: Electrification and the Diseases of Civilization*, as well as in the research of scientist/professor Dr. Magda Havas (www.magdahavas.com). These pulses of "dirty electricity" further exascerbate the problems stemming from AMI installations, but they too are ignored by PG&E and its consultant.

9. A number of physicians have signed a letter, containing many scientific citations that expresses great concern about PG&E's smart meter program and requests an immediate moratorium on installations and the opportunity for customers to opt out of the program. (A copy of that letter will be attached along with the other material I am sending you now.) Note that, due to the structure of PG&E's mesh network system, even an individual opt out privilege, while welcome, would in many cases be insufficient because of the continuing exposures from all the surrounding meters.

10. I am including here some points raised in the response just filed by the EMF Safety Network re its petition to the CPUC concerning PG&E's AMI program, some of which amplify points I have made above:

(a) PG&E's assessments of RF emissions are technically incompetent and grossly underestimated. PG&E claims that at a distance of ten feet the RF emissions from its Smart Meters are 1/6000 of the FCC RF exposure regulations, which PG&E asserts is 600 microwatts per square centimeter. (PG&E motion for dismissal, Declaration of Daniel Partridge, p. 4, Paragraph 7.) RF emissions from Smart Meters will vary based on numerous factors including duty cycles and co-location of meters. Accepting PGE's RF emission figures, without accounting for the mesh network system, additional emissions from new appliance RF transmitters inside the home, and multiple factors affecting RF emissions, constitutes technical error. [EMF Safety] Network has asserted that PG&E's RF figures are, "paltry, inconsistent and contradictory". (Application, p. 9.) To illustrate PG&E's continuing contradictions, in a July 2010 phone conversation, PG&E field representative Austin Sharp stated to a Network representative that a Smart Meter emits 8.8 microwatts per square centimeter at a distance of one foot. However, in a July 2010 response to a Network request for peak RF data, Sharp called back and stated that he spoke with a PG&E RF engineer, Jerry Hinshaw, who said that at one foot the peak RF power is 100 microwatts per square centimeter, and at 10 feet it is 1 microwatt per square centimeter. Therefore, according to PG&E, at ten feet Smart Meter RF emissions are 1/600 of their stated FCC exposure limit, not 1/6000. This is another glaring example of PG&E's inconsistent, contradictory and unreliable information, as Network stated in the Application.

In addition PG&E is now telling the public that Smart Meters transmit only 43 seconds per day in 2-20 millisecond pulses. (PG&E web site.) That amounts to up to 15 RF bursts per minute. In February 2010, Andrew Tang, PG&E Senior Director of Customer Care, said at a Sebastopol City Council meeting that Smart Meters transmitted RF data once an hour. In April 2010, at a PG&E public Smart Meter forum in Sebastopol, William Devereaux, PG&E Senior Director of the Smart Meter Program, and Michael Herz, PG&E's EMF Program manager, said to a Network representative that Smart Meters transmit once every six hours. PG&E's claims about Smart Meter RF emissions are untested and inconsistent.

The PD (i.e., proposed decision] wrongly accepts PG&E's unsubstantiated claims that the RF signals SmartMeters transmit are small. The PD's blind acceptance of unreliable information amounts to factual and technical error.

(b) The ALJ's use of ten feet as a safety benchmark is erroneous because it overlooks thousands of living situations. RF emissions increase greatly with proximity to Smart Meters. Many people sleep or spend many hours each day within a few feet of their electric or gas meters. Many customers live or work near banks of multiple meters adjacent to their homes or workplaces. Neither PG&E nor the Commission has evaluated worst-case scenarios for Smart Meter installations.

(c) The PD finds that Smart Meters "produce RF emissions far below the levels of many commonly used devices." (PD, p. 11, Finding of Fact 3.) The comparison with commonly used devices is untested and without evidentiary support, and is therefore erroneous. The Smart Meter emissions figures used in a chart distributed by PG&E have been time averaged whereas emissions for other devices are not averaged. Smart Meters transmit RF 24/7. A cell phone or a microwave oven may be used for several minutes, or not at all. Distances from such devices are essentially random (one foot, two inches, one meter, at the head) and devices are used differently. The PD's comparison is like apples to oranges. Consumers should have a choice about exposure to RF devices in their home. Network submits that the Commission should hear factual evidence about RF emissions.

(d) William Devereaux, a PG&E employee who was until recently PG&E's Senior Director of the Smart Meter Program, has attempted to mislead Network by false statements and deception, in order to spy on an adversary in a Commission proceeding… [He,] the Senior Director of the $2.2 billion PG&E Smart Meter program has publicly reassured consumers and city officials across the state that Smart Meters are safe and accurate, and meanwhile lied about his identity to infiltrate a Network discussion group. The PD's reliance on PG&E safety claims is especially egregious in light of PG&E's unethical behavior. The Commission should not blindly accept information provided by PG&E in this proceeding. Network deserves a fair hearing on health impacts of Smart Meters.

11. I am including here points raised in this week's filing (in the same case as # 10 above) by the CPUC's Division of Ratepayer Advocates (DRA):

(a) [The PD's] findings (which are supported by a very limited record) are not sufficient to support the implicit conclusion that RF emissions from the SmartMeter system are within safe limits… The FCC's authority to regulate RF emissions does not deprive this Commission [the CPUC] of its authority under state law to ensure that the in-state utility infrastructure does not jeopardize public health and welfare.

(b) The PD appears to grant the Motion to Dismiss based on the following findings of fact:
[1]. All radio devices in PG&E's Smart Meters are licensed or certified by the FCC and comply with all FCC requirements.
[2]. Smart Meters produce RF emissions far below health standards adopted by the FCC.
[3]. Smart Meters produce RF emissions far below the levels of many commonly used devices.
The only record evidence to support these findings is found in a declaration by Daniel M. Partridge on behalf of PG&E. The declaration contains broad assertions about the level of RF exposure attributable to PG&E SmartMeters: "Exposure to radio frequency energy from SmartMeters™ is considerably less than the exposure from other radio devices in widespread use." "There are many other wireless devices in commonplace use in addition to the radio devices listed above. These devices often involve more frequent radio transmission, emit radio frequency energy for longer periods of time and operate in much closer proximity to humans, than the PG&E SmartMeter™ devices."
These assertions are apparently based on certain unstated assumptions about the circumstances of exposure:
"SmartMeter™ emissions will result in exposures that are very small compared to existing exposure regulations. For the electric SmartMeter™, the RF fields at 10 feet or beyond will be less than 0.1 microwatts per square centimeter."
When he expressly addresses circumstances that could impact exposure, Mr. Partridge states:
"The SmartMeter™ radio is typically located on the outside of buildings at some distance and blocked by walls from human inhabitants. Also it transmits for a very short duration." The declaration does not address to what extent these conditions apply to PG&E customer dwellings and places of work. These statements constitute the whole of the evidence regarding RF emissions in the record of this proceeding. The declaration references critical information which is not in the record and has not been tested in this proceeding.
As DRA noted in comments filed on October 20, 2010 in Application 10-09-012, determination of a causal relationship between SmartMeters and customer health requires a three-step process analogous to establishing air quality impacts. Calculating source emission levels is only the first step. The declaration offered by PG&E implies there is only a single source of RF emissions from PG&E's AMI system, but does not clearly define the source or state the RF power output of this undefined source. In actuality, the AMI system has multiple sources, including the mesh radio on the customer's electric meter, the mesh radios on the neighboring electric meters, RF radios on local gas meter modules, home area network (HAN) radios, and signals from the communication network equipment for both gas and electric meters, such as data collector units (DCUs) and repeater stations such as PG&E's proposed "SUNDS" system. [PG&E is developing a Subterranean Urban Network Deployment System (SUNDS) system to address the "unique challenges in RF communication" in dense urban

areas such as San Francisco's financial district.] It is possible that the power of these RF radios vary depending on the location and type of meter installed, and the local configuration of the RF networks required to ensure regular communication…
{EMF correctly rebutted that RF signals are not "blocked by walls" (EMF Response dated May 27, pp.3-4).}
These steps are to calculate source emission levels, model exposure or emissions concentrations at specific locations adjacent to the source; and compare modeled exposure to relevant standards. In providing a single example of RF emissions, PG&E is not providing a complete catalog of the AMI-driven RF sources that impact its customers. An accurate assessment of the RF emissions from the AMI system should begin by quantifying the RF emission power and directionality of all AMI system components which could impact customers. { For example, the record does not indicate if all residential meters have the same RF power output, nor if this power output differs from small or large commercial customers.}
Another key element of RF emissions mentioned in Mr. Partridge's declaration is the transmission path, including both the distance between the source and receiver and the materials between them. Mr. Partridge posits an RF emission level 10 feet from the source without commenting on whether this distance is typical for SmartMeter installations, and what materials may be within this 10-foot path. Many customers have meters installed in a garage where they might spend a significant amount of time, or on a wall that bounds a high-use living space such as a bedroom or family room. Finally, the time element must be considered. PG&E has indicated that the meter radio "transmits for a very short duration", but doesn't quantify the duty cycle of any of the RF radios, the variations that can be expected, or how transmissions from multiple radios might compound exposure. It seems likely based on the factors discussed above that RF exposure could vary significantly among the millions of customer installation sites, and customer locations within those sites. Typical RF exposure levels that impact the majority of PG&E customers will be an important data point when evaluating the health impacts of PG&E's AMI system and the data provided by PG&E suggests that typical exposure will be low. However, outlier situations with higher than average RF exposure, such as a bedroom bounded by a wall that holds all meters for an apartment complex, must also be considered.
DRA has made recommendations on the type of data that should be compiled by the Commission as well as a process for vetting this data, in comments responding to an application to modify the PG&E AMI decision filed by CARE. {Response of the Division of Ratepayer Advocates to Application of Californians for RenewableEnergy, Inc. (CARE) to Modify Decision 06-06-027, filed October 20, 2010 in A.10-09-012.} DRA incorporates by reference and reiterates those recommendations, and further recommends that the Commission gather adequate data (and allow that data to be reviewed in a public proceeding) before reaching conclusions on the RF emissions from PG&E's AMI system. DRA is not presuming that there are health effects caused by RF emissions from PG&E's AMI system. It reminds the Commission that it has a constitutionally mandated

requirement to investigate the possibility of health effects and make sound conclusions based in solid evidence.

(c) In response to Network's application, PG&E states that AMI RF emissions are much smaller than other RF emission sources in our environment, and also that by themselves, they are much lower than FCC standards. These statements do not address the question of whether the impacts of AMI RF emissions should be considered *in addition to* those from other sources — whether AMI RF emissions could be the proverbial "straw that broke the camel's back." Conceptually, it is reasonable to assume that there may be cumulative impacts of RF exposure, particularly since FCC standards are based on thermal effects, and temperature increases from one heat source compound if another heat source is added to the system. Cumulative exposure is relevant when considering other environmental impacts such as air, water, and noise pollution. Even FCC regulations seem to indicate that cumulative impacts need to be considered. For example, the FCC states that "at multiple-transmitter sites, all significant contributions to the RF environment should be considered, not just those fields associated with one specific source." In the situation where a new large transmitter that is not "categorically exempt" pushes RF exposure over the FCC limits, "it is the responsibility of the applicant to ensure compliance, since the existing site is already in compliance." DRA recommends that the Commission consider whether background RF exposure is germane to the determination of safe AMI RF emissions.

(d) The PD concludes that "[i]t is not reasonable" to consider "the alleged health impacts of RF emissions from Smart Meters at this time" and grants PG&E's Motion To Dismiss. These conclusions appear to be based on the perception that Smart Meters will make "a relatively tiny contribution…to RF exposure relative to other source in our modern environment." The PD finds that "Smart Meters produce RF levels far below health standards adopted by the FCC" and "below the levels of many commonly used devices." But these findings are based solely on the information provided by PG&E in response to Network's application, which provided only a single estimate of RF exposure without discussion of range of exposure levels that will be experienced by *all* of PG&E's customers. In addition, the combined impact of the AMI system emissions *in addition to* other sources of RF emissions, as discussed in the preceding section, was not addressed by PG&E. The record contains no information about whether new RF emissions from AMI should be considered in isolation, or in combination with emissions from existing RF sources. For these reasons, both the findings and the evidence on which they are based are insufficient to support the PD's implicit, broad conclusion that the RF emissions from the AMI system are within safe limits.

(e) **CONCLUSION**

Notwithstanding the FCC's authority to set RF emissions standards, this Commission has ample authority (as well as a responsibility) under the Public Utilities Code to ensure that PG&E's AMI system poses no threat to public health or safety. The PD errs in reaching conclusions based on limited and incomplete evidence about the RF

emissions from PG&E's AMI system. The record in this proceeding is not robust enough to support conclusions about the health impacts of Smart Meters. DRA recommends that the Commission delay consideration of this PD until additional evidence is compiled and reviewed in a public process. If the Commission decides to defer all questions concerning RF emissions of the AMI system to the FCC, it should refrain from making findings about Smart Meter RF exposure levels that are not supported by complete and adequate data, as this PD does. DRA strongly recommends the first approach as a means of building public confidence in the statewide advanced metering network, and restoring confidence in the Commission as a defender of the public interest.

12. Physician Toril Jelter made comments virtually identical to her letter below directly to the CPUC at one of their meetings:

"**I am Toril H. Jelter, a board certified pediatrician specializing in medical and environmental aspects of autism related illness. I have health concerns regarding the unbridled roll out of wireless technologies without adequate health studies beforehand.**

Dear FDA/FCC,

I request a moratorium on the Smart Meter roll out ASAP until a proper assessment of health effects has been conducted.

Here are a few patient stories for your review:

A 2 year old child can't sleep at night. He screams inconsolably for hours. When the mother takes the child away from the SF Bay area to a remote area with poor cell phone reception the child sleeps well every night and naps as a normal 2 year old would during the day.

A 40 year old man with MS & EHS (multiple sclerosis and electrohypersensitivity) requests no Smart Meter. His doctor writes a letter to support this request. It is granted BUT only temporarily! His 4 neighbors get a Smart Meter and he develops such severe ringing in the ears (tinnitus) that he is no longer able to sleep indoors. He discovers that the only way he can sleep is to sleep outdoors. (This could be explained by the cumulative effect of EMF in his home + the Smart Meters next door.)

A 45 year old woman with MS has been stable for several years. After installment of a Smart Meter she goes down hill rapidly. Depression,flu-like symptoms and severe fatigue.

Another woman with MS 50 years old improving. Gets a Smart Meter. Gets worse balance, worsening depression. Falls breaks 2 ribs and punctures a lung.

A 10 year old child with high functioning autism gets a Smart Meter. His handwriting deteriorates. He seems more fatigued. He gets flu like symptoms frequently. Looses his appetite. Stops gaining weight.

A 65 year old woman gets a Smart Meter, actually 4 at the head of her bed. (condo) She develops severe tinnitus, sleep disturbance, intermittent confusion, memory problems, heart palpitations and diabetes.

PLEASE HAVE AT LEAST ONE PERSON READ AND UNDERSTAND THE BIOINITIATIVE REPORT and explain it to you to decrease this level of functional disability and suffering. Remember 10-15% of our children already have neurodevelopmental problems. The autism rates are going thru the roof. I fear this will speed things up even more. At this rate close to 100% of our children will be autistic within 100 years. PLEASE think long term NOT just short term.

Thank-you for reading this and for hopefully being a part of alleviating human suffering.

Best Regards, Dr. Jelter

13. Germany warns citizens to avoid using Wi-Fi

Environment Ministry's verdict on the health risks from wireless technology puts the British government to shame.

By Geoffrey Lean, Published: 09 September 2007, *The Independent*

People should avoid using Wi-Fi wherever possible because of the risks it may pose to health, the German government has said. Its surprise ruling – the most damning made by any government on the fast-growing technology –will shake the industry and British ministers, and vindicates the questions that The Independent on Sunday has been raising over the past four months.
And Germany's official radiation protection body also advises its citizens to use landlines instead of mobile phones, and warns of "electrosmog" from a wide range of other everyday products, from baby monitors to electric blankets.
The German government's ruling – which contrasts sharply with the unquestioning promotion of the technology by British officials – was made in response to a series of questions by Green members of the Bundestag, Germany's parliament.

The Environment Ministry recommended that people should keep their exposure to radiation from Wi-Fi "as low as possible" by choosing "conventional wired connections". It added that it is "actively informing people about possibilities for reducing personal exposure". Its actions will provide vital support for Sir William Stewart, Britain's official health protection watchdog, who has produced two reports calling for caution in using mobile phones and who has also called for a review of the use of Wi-Fi in schools. His warnings have so far been ignored by ministers and even played down by the Health Protection Agency, which he chairs. By contrast the agency's German equivalent – the Federal Office for Radiation Protection – is leading the calls for caution. Florian Emrich, for the office, says Wi-Fi should be avoided "because people receive exposures from many sources and because it is a new technology and all the research into its health effects has not yet been carried out".

14. Among the considerable amounts of valuable supporting information available online, the following are definitely worthy of your panel’s inclusion in its study:

http://www.hese-project.org/hese-uk/en/papers/goldsworthy_bio_weak_em_07.pdf Scientist Andrew Goldsworthy's 2007 paper, entitled "The Biological Effects of Weak Electromagnetic Fields", with references to many research studies.

http://www.mwr.medianis.net/pdf/Vol11No2-03-IBelyaev.pdf Igor Belyaev's 2005 paper "Non-thermal Biological Effects of Microwaves", also with many relevant citations, published in "Microwave Review".

http://www.buergerwelle.de/pdf/shocking8.pdf Dr. Donald Hillman's 2005 paper "Exposure to Electric and Magnetic Fields (EMF) Linked to Neuro-Endocrine Stress Syndrome: Increased Cardiovascular Disease, Diabetes, & Cancer", also containing many relevant scientific references.

The above three are amongst the many relevant scientific reports linked to at http://www.tetrawatch.net/links/links.php?id=health&list=biological . I strongly recommend that the study panel peruse the entire list of links at this web page before writing its report.

http://www.radiationresearch.org website of the EM Radiation Research Trust.

http://www.hese-project.org/hese-uk/en/main/index.php Valuable website covering scientific investigations of microwave/RF pulsed transmissions and health; studies translated into English from various languages.

http://www.emrpolicy.org/science/forum This "Science Forum" web page contains analysis of bioelectromagnetics research by researchers and other professionals in the field. It includes reviews on various areas of research, papers presented at scientific conferences as well as expert comments that have been submitted to legislative bodies and regulatory agencies in the US and internationally. It should be very useful for the CCST panel's smart meters study. One of the many examples linked to is:
http://www.emrpolicy.org/science/forum/volkrodt_elect_pollution_environ.pdf which discusses the (non-thermal) biological dangers of pulsed microwave emissions.

http://www.magdahavas.com/2010/09/06/pick-of-the-week-9-0-95-and-2-45-ghz-most-lethal-microwave-frequencies/ Summary with link to:
Polson, P, DCL Jones, A Karp, and JS Krebs. 1974. Mortality in rats exposed to CW microwave radiation at 0.95, 2.45, 4.54, and 7.44 GHz. Final Technical Report Prepared for U.S. Army Mobility Equipment Research and Development Center, Fort Belvoir, Virginia, Contract DAAK02-73-C-0453. 105 pp.
Smart Meters use 902-928 MHz and 2.45 GHz. Lowest lethal peak power tested in SRI study was 200,000 microwatts per cm2 (continuous wave).

http://electromagnetichealth.org/electromagnetic-health-blog/cordless-heart/ Press release: Radiation from Cordless Phones Causes Heart Irregularities, According to New Research Published Today in the European Journal of Oncology.

http://electromagnetichealth.org/wp-content/uploads/2010/10/Havas_HRV_Ramazzini1.pdf
Havas et al: , "Provocation Study using Heart Rate Variability Shows Radiation from 2.4 GHz Cordless Phone Affects Autonomic Nervous System".

http://www.emrpolicy.org/science/forum/29june08_christensen_op_ed.pdf
www.startribune.com/opinion/commentary/22122349.html
"Watch where you're beaming that signal", Jackie Hunt Christensen
Article on interference from EMF and wireless on Parkinson's implants.

http://www.emrpolicy.org/science/forum/adey_jostes_nas_panel.pdf
Dr. Ross Adey response to PAVE PAWS invitation, July 31, 2002.

15. As promised above, a selection of relevant studies demonstrating non – thermal biological interactions from pulse-modulated fields follows here. References to literally thousands of other such studies can be obtained by sending an email request to Dr. Magda Havas, at mhavas@trentu.ca. Others can be found by visiting her website www.magdahavas.com and clicking on "Zory's Archive". In addition, I recommend that the panel read 3 new books on the subject, which themselves are laden with relevant scientific references: they are" "Disconnect" by Dr. Devra Davis (epidemiologist), "Dirty Electricity" by Dr. Samuel Milham (epidemiologist), and "Zapped" by Anne Louise Gittleman (nutritionist/health educator).

Ahlbom A, Green A, Kheifets L, Savitz D, Swerdlow A. 2004. Epidemiology of health effects of radiofrequency exposure. ICNIRP (International Commission for Non-ionizing Radiation Protection) Standing Committee on Epidemiology. *Environ Health Perspect* 112:1741-1754.
Auvinen A, Hietanen M, Luukonen R, Koskela RS. 2002. Brain tumors and salivary gland cancers among cellular telephone users. *Epidemiology* 13:356-359.
Christensen HC, Schüz J, Kosteljanetz M, Poulsen HS, Thomsen J, Johansen C.2004. Cellular telephone use and risk of acoustic neuroma. *Am J Epidemiol* 159:277-283.
Christensen HC, Schüz J, Kosteljanetz M, *et al*. 2005. Cellular telephones and risk for brain tumors. A population-based, incident case-control study. *Neurology* 64:1189-1195.
Funch DP, Rothman KJ, Loughlin JE, Dreyer NA. 1996. Utility of telephone company records for epidemiologic studies of cellular telephones. *Epidemiology* 7:299-302.
Hardell L, Näsman Å, Påhlson A, Hallquist A, Hansson Mild K. 1999. Use of cellular telephones and the risk for brain tumours:A case-control study. *Int J Oncol* 15:113-116.
Hardell L, Hansson Mild K, Påhlson A, Hallquist A.2001. Ionizing radiation, cellular telephones and the risk for brain tumours. *Eur J Cancer Prev* 10:523-529.
Hardell L, Hansson Mild K, Sandström M. 2003. Vestibular schwannoma, tinnitus and mobile telephones. *Neuroepidemiology* 22:124-129.
Hardell L, Hansson Mild K, Carlberg M, Hallquist A. 2004. Cellular and cordless telephones and the association with brain tumours in different age groups. *Arch Environ Health* 59(3): 132-137.
Hardell L, Carlberg M, Hansson Mild K. Pooled analyis of two case-control studies on the use of cellular and cordless telephones and the risk of benign tumours diagnosed during 1997-2003. *Int J Oncol* 28:509-518.
Hardell L, Hansson Mild K, Carlberg M.2006a. Pooled analysis of two case-control studies on use of cellular and cordless telephones and the risk for malignant brain tumours diagnosed in 1997-2003. *Int Arch Occup Environ Health* 2006b, 79:630-639.
Hardell L, Carlberg M, Söderqvist F, Hansson Mild K, Morgan LL. Long-term use of

cellular phones and brain tumours: increased risk associated with use for > 10 years. *Occup Environ Med* 2007;64:626-632, doi:10.1136/oem.2006.029751.
Hepworth SJ, Schoemaker MJ, Muir KR, Swerdlow AJ, van Tongeren MJ, McKinney PA. 2006. Mobile phone use and risk of glioma in adults: case-control study. *BMJ*15;332(7546):883-887. Epub 2006 Jan 20.
Inskip PD, Tarone RE, Hatch EE, *et al*. Cellular-telephone use and brain tumors. 2001. *New Engl J Med* 344:79-86.
Johansen C, Boice JD Jr, McLaughlin JK, Olsen JH 2001. Cellular telephones and cancer – a nationwide cohort study in Denmark. *J Natl Cancer Inst* 93:203-207.
Klaeboe L, Blaasaas KG, Tynes T. 2007. Use of mobile phones in Norway and risk of intracranial tumours. *Eur J Cancer Prev* 16:158-164.
Lahkola A, Tokola K, Auvinen A. 2006. Meta-analysis of mobile phone use and intracranial tumors. *Scand J Work Environ Health* 32(3):171-177.
Lahkola A, Auvinen A, Raitanen J, *et al*. 2007. Mobile phone use and risk of glioma in 5 North European countries. *Int J Cancer* 120:1769-1775.
Lönn S, Ahlbom A, Hall P, Feychting M. 2004. Mobile phone use and the risk of acoustic neuroma. *Epidemiology* 15: 653-659.
Lönn S, Ahlbom A, Hall P, Feychting M 2005. Swedish Interphone Study Group.Longterm
mobile phone use and brain tumor risk. *Am J Epidemiol* 161:526-535.
Muscat JE, Malkin MG, Thompson S, *et al*. 2000. Handheld cellular telephone use and risk of brain cancer. *JAMA* 284:3001-3007.
Muscat JE, Malkin MG, Shore RE, *et al*. 2002. Handheld cellular telephones and risk of acoustic neuroma *Neurology* 58:1304-1306
Schoemaker MJ, Swerdlow AJ, Ahlbom A, *et al*. 2005. Mobile phone use and risk of acoustic neuroma: results of the Interphone case-control study in five North European countries. *Br J Cancer* doi: 10.1038/sj.bjc.6602764.
Schüz J, Böhler E, Berg G, Schlehofer B, *et al*. 2006. Cellular phones, cordless phones, and the risks of glioma and meningioma (Interphone Study Group, Germany). *Am J Epidemiology* 163(6):512-520. Epub 2006 Jan 27. Comment by Morgan in: *Am J Epidemiol* 2006;164:294-295. Author reply 295.
Schüz J, Jacobsen R, Olsen JH, *et al*. 2006. Cellular telephone use and cancer risks: An update of a nationwide Danish cohort. *J Natl Cancer Inst* 98:1707-1713.
Schlehofer B, Schlafer K, Blettner M, *et al*. 2007. Environmental risk factors for sporadic acoustic neuroma (Interphone Study Group, Germany). *Eur J Cancer* doi:10.1016/j.ejca.2007.05.008.
Takebayashi T, Akiba S, Kikuchi Y, *et al*. 2006. Mobile phone use and acoustic neuroma risk in Japan. *Occup Environ Med* 63:802-807.
Vrijheid M, Cardis E, Armstrong BK, *et a*l. 2006a. Validation of short term recall of mobile phone use for the Interphone study. *Occup Environ Med* 63:237-243.
Vrijheid M, Deltour I, Krewski D, Sanchez M, Cardis E. 2006b. The effects of recall errors and selection bias in epidemiologic studies of mobile phone use and cancer risk. *J Expo Sci Environ Epidemiol* doi:10.1038/sj.jes.7500509.
Ahlbom A, Green A, Kheifets L, Savitz D, Swerdlow A. 2004. Epidemiology of health effects of radiofrequency exposure. Environ Health Perspect 112: 1741–1754.
Altpeter ES, Krebs TT, Pfluger DH, von Kanel J, Blattmann R. 1995. Study on health effects of the short-wave transmitter station at Schwarzenburg, Berne, Switzerland," BEW Publication Series No. 55, University of Berne, Inst. for Social & Preventive Medicine.
Armstrong B, Theriault G, Guenel P, Deadman J, Goldberg M, Heroux P. 1994. Association between exposure to pulsed electromagnetic fields and cancer in electric utility workers in Quebec, Canada, and France. Am J Epidemiol 140: 805 – 820.
Berg G, Spallek J, Schüz J, Schlehofer B, Böhler E, Schlaefer K, Hettinger I, Kunna-Grass K, Wahrendorf J, Blettner M. 2006. Occupational exposure to radio

frequency/microwave radiation and the risk of brain tumors: Interphone Study Group, Germany. Am J Epidemiol.
Bergqvist U. 1997. Review of epidemiological studies. In: Kuster N, Balzano Q, Lin JC (eds.), Mobile Communications Safety, London: Chapman & Hall, pp. 147 – 170
Bielski J. 1994. Bioelectrical brain activity in workers exposed to electromagnetic fields," Ann N Y Acad Sci 724: 435 – 437
Boscolo P. 2001. Effects of electromagnetic fields produced by radiotelevision broadcasting stations on the immune system of women. Sci Total Environ 273: 1 – 10
Cantor K, Stewart P, Brinton L, Dosemeci M. 1995. Occupational exposure and female breast cancer mortality in the United States. J Occup Environ Med 37: 336-348
Coleman M, Bell J, Skeet R. 1983. Leukaemia incidence in electrical workers. Lancet 1:982 – 983
Coleman M. 1985. Leukaemia mortality in amateur radio operators. Lancet 2: 106 – 107
Cooper DK, Hemmings K, Saunders P 2001. Cancer incidence near radio and television transmitters in Great Britain. I. Sutton Coldfield transmitter; II. All high power transmitters. Am J Epidemiol 153: 202 – 204
Czerski P, Siekierzynski M, Gidynski A. 1974. Health surveillance of personnel occupationally exposed to microwaves. I. Theoretical considerations and practical aspects. Aerospace Med 45: 1137 – 1142
Davis RL, Mostofi FK. 1993. Cluster of testicular cancer in police officers exposed to hand -held radar. Am J Ind Med 24: 231-233
De Roos AJ, Teschke K, Savitz DA, Poole C, Grufferman BH, Pollock BH. 2001. Parental occupational exposures to electromagnetic fields and radiation and the incidence of neuroblastoma in offsping. Epidemiol 12: 508 – 517
Demers PA, Thomas DB, Rosenblatt KA, Jimenez LM, McTiernan A, et al. 1991. Occupational exposure to electromagnetic fields and breast cancer in men. Am J Epidemiol 134: 340 – 347
Dolk H, Shaddick G, Walls P, Grundy C, Thakrar B, Kleinschmidt I, Elliott P. 1997a. Cancer incidence near radio and television transmitters in Great Britain, Part I. Sutton Coldfield Transmitter. Am J Epidemiol 145: 1-9.
Dolk H, Elliot P, Shaddick G, Walls P, Thakrar B. 1997b. Cancer incidence near radio television and transmitters in Great Britain, Part II. All high-power transmitters. Am J Epidemiol 145: 10-17.
Elwood MJ. 2003. Epidemiological studies of radiofrequency exposures and human cancer. Bioelectromagnetics Suppl 6: S63 - S73.
Finkelstein MM. 1998. Cancer incidence among Ontario police officers. Am J Ind Med 34: 157-162.
Gallagher RP, Band PR, Spinelli JJ, Threlfall WJ, Tamaro S. 1991. Brain cancer and exposure to electromagnetic fields. J Occup Med 33: 944 – 945
Garaj-Vrhovac V. 1999. Micronucleus assay and lymphocyte mitotic activity in risk assessment of occupational exposure to microwave radiation. Chemosphere 39: 2301 – 2312
Garson OM, McRobert TL, Campbell LJ, Hocking BA, Gordon I. 1991. A chromosomal study of workers with long-term exposure to radio-frequency radiation. Med J Australia 155: 289 – 292.
Grayson JK. 1996. Radiation exposure socioeconomic status and brain tumor risk in the US Air Force: a nested case-control study. Am J Epidemiol 143: 480-486.
Groves FD, Page WF, Gridley G, Lisimaque L, Stewart PA, Tarone RE et al. 2002. Cancer in Korean war navy technicians: mortality survey after 40 years. Am J Epidemiol 155: 810-818.
Hallberg O, Johansson O. 2002a. Melanoma incidence and frequency modulation (FM) broadcasting. Arch Environ Health 57: 32 – 40
Hallberg O, Johansson O. 2002b. Cancer trends during the 20th century. J Australian College Nutrtr Environ Med. 21: 3 – 8

Hayes RB, Brown LM, Pottern LM, Gomez M, Kardaun JWPF, Hoover RN, O'Connell KJ, Sutzman RE, Javadpour N. 1990. Occupation and risk of testicular cancer: a casecontrol
study. Int J Epidemiol 19: 825-831
Hill DG. 1988. A longitudinal study of a cohort with past exposure to radar: the MIT Radiation Laboratory follow-up study. [Dissertation Manuscript], Johns Hopkins University, Baltimore, MD, UMI Dissertation Services, Ann Arbor, MI
Hocking B, Gordon IR, Grain ML, Hatfield GE. 1996. Cancer incidence and mortality and proximity to TV towers. Med J Aust 165: 601-605
Holly EA, Aston DA, Ahn DK, Smith AH. 1996. Intraocular melanoma linked to occupations and chemical exposures. Epidemiology 7: 55-61
Kaplan S, Etlin S, Novikov I, Modan B. 1997. Occupational risks for the development of brain tumors. Am J Ind Med 31: 15 – 20.
Krewski D, Byus CV, Glickman BW, Lotz WG, Mandeville R, McBride ML, Prato FS, Weaver DF. 2001. Potential health risks of radiofrequency fields from wireless telecommunication devices. J Tox Env Health Part B 4: 1-143.
Kundi M, Hansen Mild K, Hardell L, Mattsson MO. 2004. Mobile telephones and cancer - a review of epidemiological evidence. J Toxicol Envrion Health Part B 7: 351-384.
Kundi M. 2006. Causality and the interpretation of epidemiologic evidence. Environ Health Perspect 114: 969 – 974
Kurt TL, Milham S. 1988. Re: Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies. [Letter and Reply] Am J. Epidemiol 128: 1384–1385
Lagorio S, Rossi S, Vecchia P, De Santis M, Bastianini L, Fusilli M, Ferrucci A, Desideri E, Comba P. 1997. Mortality of plastic-ware workers exposed to radiofrequencies. Bioelectromagnetics 18: 418-421
Lalic H, Lekic A, Radosevic-Stasic B. 2001. Comparison of chromosome aberrations in peripheral blood lymphocytes from people occupationally exposed to ionizing and radiofrequency radiation. Acta Medica Okayama 55: 117 – 127
Lilienfeld AM, Tonascia J, Tonascia S, Libauer CH, Cauthen GM, et al. 1978. Foreign Service Health Status Study: Evaluation of Status of Foreign Service and other Employees From Selected Eastern European Posts. NTIS Document No. PB-28B 163/9GA Dept. of State, Washington DC, Final Report,
Dept. of Epidemiology, School of Hygiene Public Health, Johns Hopkins University, Baltimore, MD
Maskarinec G, Cooper J, Swygert L. 1994. Investigation of increased incidence in childhood leukemia near radio towers in Hawaii: preliminary observations. J Environ Pathol Toxicol Oncol 13: 33-37
McKenzie DR, Yin Y, Morrell S. 1998. Childhood incidence and acute lymphoblastic leukaemia and exposure to broadcast radiation in Sydney – a second look. Aust NZ J Public Health 22: 360-367
Michelozzi P, Capon A, Kirchmayer U, Forastiere F, Biggeri A, Barca A, Perucci CA. 2002. Adult and childhood leukemia near a high-power radio station in Rome, Italy. Am J Epidmiol 155: 1096-1103
Milham S. 1982. Mortality from leukemia in workers exposed to electrical and magnetic fields. [Letter] New England J Med 307: 249 – 249
Milham S. 1983. Occupational mortality in Washington State: 1950-1979. DHHS (NIOSH) Publication 83-116, October 1983, Contract No. 210-80-0088, U.S. Depart. of Health and Human Services, National Institute for Occupational Safety and Health, Cincinnati, OH
Milham S. 1985. Mortality in workers exposed to electromagnetic fields. Environ Health Perspect 62: 297 – 300
Milham S. 1988a. Increased mortality in amateur radio operators due to lymphatic and hematopoietic malignancies. Am J Epidemiol 127: 50-54

Milham S. 1988b. Mortality by license class in amateur radio operators. Am J Epidemiol 128: 1175 – 1176
Morgan RW, Kelsh MA, Zhao K, Exuzides KA, Heringer S, Negrete W. 2000. Radiofrequency exposure and mortality from cancer of the brain and lymphatic/hematopoietic systems. Epidemiology 11: 118-127
Moulder JE, Erdreich LS, Malyapa RS, Merritt JH, Pickard WF, Vijayalaxmi. 1999. Cell phones and cancer: what is the evidence for a connection? Radiat Res 151: 513 – 531
Muhm JM. 1992. Mortality investigation of workers in an electromagnetic pulse test program. J Occup Med 34: 287-292
Pearce N, Reif J, Fraser J. 1989. Case-control studies of cancer in New Zealand electrical workers. Int J Epidemiol 18: 55 – 59
Pearce NE, Sheppard RA, Howard JK, Fraser J, Lilley BM. 1985. Leukaemia in electrical workers in New Zealand. [Letter] Lancet 1: 811 – 812
Pearce NE. 1988. Leukemia in electrical workers in new Zealand: a correction. [Letter] Lancet 2: 48
Richter ED, Berman T, Ben-Michael E, Laster R, Westin JB. 2000. Cancer in radar technicians exposed to radiofrequency/microwave radiation: Sentinel episodes. Int J Occup Environ Health 6: 187 – 193
Robinette CD, Silverman C, Jablon S. 1980. Effects upon health of occupational exposure to microwave radiation radar. Am J Epidemiol 112: 39 – 53
Robinette CD, Silverman C. 1977. Causes of death following occupational exposure to microwave radiation (radar) 1950-1974. In Hazzard (ed), Symposium on Biological Effects and Measurement of radiofrequency Microwaves, Dept. of Health, Education, and Welfare, Washington, DC, HEW Publication No. (FDA) 77-8026: 338 – 344
Selvin S, Schulman J, Merrill DW. 1992. Distance and risk measures for the analysis of spatial data: a study of childhood cancers. Soc Sci Med 34: 769-777
Siekierzynski M, Czerski P, Milczarek H, Gidynski A, Czarnecki C, Dziuk E, Jedrzejczak W. 1974a. Health surveillance of personnel occupationally exposed to microwaves. II. Functional disturbances. Aerospace Med 45: 1143 – 1145
Siekierzynski M, Czerski P, Milczarek H, Gidynski A, Czarnecki C, Dziuk E, Jedrzejczak W. 1974b. Health surveillance of personnel occupationally exposed to microwaves. III. Lens translucency. Aerospace Med 45: 1146 – 1148
Speers MA, Dobbins JG, Miller VS. 1988. Occupational exposures and brain cancer mortality: a preliminary study of East Texas residents. Am J Ind Med 13: 629 – 638
Spitz MR, Johnson CC. 1985. Neuroblastoma and paternal occupation. A case-control analysis. Am J Epidemiol 121: 924 – 929
Stewart, Sir W. 2000. Mobile Phones and Health. Report by the UK Independent Expert Group on Mobile Phones. c/o UK National Radiological Protection Board, Chilton, Didcot, Oxon OX11 0RQ pp. 1 – 160.
Szmigielski S, Kubacki R. 1999. Analysis of cancer morbidity in Polish career military personnel exposed occupationally to RF and MW radiation. In: F. Bersani (ed.), Electricity and Magnetism in Biology and Medicine, Kluwer Academic/ Plenium, pp. 809 – 812.
Szmigielski S. 1996. Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation. Sci Total Environ 180: 9-17.
Thomas TL, Stolley PD, Stemhagen A, Fontham ETH, Bleeker ML, Stewart PA et al. 1987. Brain tumour mortality risk among men with electrical and electronic jobs: a casecontrol
study. J Natl Cancer Inst 79: 233-238
Tornqvist S, Knave B, Ahlbom A, Persson T. 1991. Incidence of leukaemia and brain tumours in some 'electrical occupations'. Brit J Indust Med 48: 597 – 603
Tynes T, Andersen A, Langmark F. 1992. Incidence of cancer in Norwegian workers potentially exposed to electromagnetic fields. Am J Epidemiol 136: 81-88

Tynes T, Hannevik M, Andersen A, Vistnes AI, Haldorsen T. 1996. Incidence of breast cancer in Norwegian female radio and telegraph operators. Cancer Causes Control 7: 197-204
Wiklund K. 1981. An application of the Swedish cancer-environment registry: leukaemia among Telefone operators at the telecommunications administration in Sweden. Int J Epidemiol 10: 373 – 376
Wright WE, Peters JM, Mack TM. 1982. Leukaemia in workers exposed to electrical and magnetic fields. Lancet 307: 1160 – 1161
Aalto S, Haarala C, Bruck A, Sipila H, Hamalainen H, Rinne JO.
Mobile phone affects cerebral blood flow in humans. J Cereb Blood Flow Metab. 26(7):885-890, 2006.
Abdel-Rassoul G, El-Fateh OA, Salem MA, Michael A, Farahat F, El-Batanouny M, Salem E. Neurobehavioral effects among inhabitants around mobile phone base stations. Neurotoxicology. 28:434-440, 2007.
Al-Khlaiwi T, Meo SA. Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population. Saudi Med J. 25(6):732-736, 2004.
Arai N, Enomoto H, Okabe S, Yuasa K, Kamimura Y, Ugawa Y. Thirty minutes mobile phone use has no short-term adverse effects on central auditory pathways. Clin Neurophysiol. 114(8):1390-394, 2003.
Aran JM, Carrere N, Chalan Y, Dulou PE, Larrieu S, Letenneur L, Veyret B, Dulon D. Effects of exposure of the ear to GSM microwaves: in vivo and in vitro experimental studies. Int J Audiol. 43(9):545-554, 2004.
Balik HH, Turgut-Balik D, Balikci K, Ozcan IC. Some ocular symptoms and sensations experienced by long term users of mobile phones. Pathol Biol (Paris). 53(2):88-91, 2005.
Balikci K, Cem Ozcan I, Turgut-Balik D, Balik HH. A survey study on some neurological symptoms and sensations experienced by long term users of mobile phones. Pathol Biol (Paris). 53(1):30-34, 2005.
Barteri M, Pala A, Rotella S. Structural and kinetic effects of mobile phone microwaves on acetylcholinesterase activity. Biophys Chem. 113(3):245-253, 2005.
Beason RC, Semm P. Responses of neurons to an amplitude modulated microwave stimulus. Neurosci Lett 333(3):175-178, 2002.
Bergamaschi A, Magrini A, Ales G, Coppetta L, Somma G. Are thyroid dysfunctions related to stress or microwave exposure (900 MHz)? Int J Immunopathol Pharmacol. 17(2 Suppl):31-36, 2004.
Besset A, Espa F, Dauvilliers Y, Billiard M, de Seze R. No effect on cognitive function from daily mobile phone use. Bioelectromagnetics. 26(2):102-108, 2005.
Borbely, AA, Huber, R, Graf, T, Fuchs, B, Gallmann, E, Achermann, P, Pulsed highfrequency
electromagnetic field affects human sleep and sleep electroencephalogram. Neurosci Lett 275(3):207-210, 1999.
Bornhausen M, Scheingraber H, Prenatal exposure to 900 MHz, cell-phone electromagnetic fields had no effect on operant-behavior performances of adult rats. Bioelectromagnetics 21(8):566-574, 2000.
Cao Z, Liu J, Li S, Zhao X. [Effects of electromagnetic radiation from handsets of cellular telephone on neurobehavioral function] Wei Sheng Yan Jiu 29(2):102-103, 2000.
Chia SE, Chia HP, Tan JS, Prevalence of headache among handheld cellular telephone users in Singapore: A community study. Environ Health Perspect 108(11):1059-1062, 2000.
Chou CK, Guy AW, McDougall J, Lai H, 1985, Specific absorption rate in rats exposed to 2450-MHz microwaves under seven exposure conditions, Bioelectromagnetics 6:73-88.

Cinel C, Boldini A, Russo R, Fox E. Effects of mobile phone electromagnetic fields on an auditory order threshold task. Bioelectromagnetics. 2007 May 10; [Epub ahead of print]
Cox R. Electrical Hypersensitivity – Human Studies in the UK. Conference Presentation WHO International Workshop on Electrical Hypersensitivity, October 25-27, 2004, Prague, Czech Republic.
Croft R, Chandler J, Burgess A, Barry R, Williams J, Clarke A. Acute mobile phone operation affects neural function in humans. Clin Neurophysiol 113(10):1623, 2002.
Crouzier D, Debouzy JC, Bourbon F, Collin A, Perrin A, Testylier G. Neurophysiologic effects at low level 1.8 GHz radiofrequency field exposure: a multiparametric approach on freely moving rats. Pathol Biol (Paris). 55:134-142, 2007.
Curcio G, Ferrara M, De Gennaro L, Cristiani R, D'Inzeo G, Bertini M. Time-course of electromagnetic field effects on human performance and tympanic temperature. Neuroreport. 15(1):161-164, 2004.
Curcio G, Ferrara M, Moroni F, D'Inzeo G, Bertini M, De Gennaro L.
Is the brain influenced by a phone call? An EEG study of resting wakefulness. Neurosci Res. 53:265-270, 2005.
Davidson HC, Lutman ME. Survey of mobile phone use and their chronic effects on the hearing of a student population. Int J Audiol. 46(3):113-118, 2007.
D'Costa H, Trueman G, Tang L, Abdel-rahman U, Abdel-rahman W, Ong K, Cosic I. Human brain wave activity during exposure to radiofrequency field emissions from mobile phones. Australas Phys Eng Sci Med. 26(4):162-167, 2003.
Dubreuil D, Jay T, Edeline JM. Does head-only exposure to GSM-900 electromagnetic fields affect the performance of rats in spatial learning tasks? Behav Brain Res 129(1-2):203-210, 2002.
Dubreuil D, Jay T, Edeline JM.Head-only exposure to GSM 900-MHz electromagnetic fields does not alter rat's memory in spatial and non-spatial tasks. Behav Brain Res. 145(1-2):51-61, 2003.
Edelstyn N, Oldershaw A. The acute effects of exposure to the electromagnetic field emitted by mobile phones on human attention. Neuroreport 13(1):119-121, 2002.
Eliyahu I, Luria R, Hareuveny R, Margaliot M, Meiran N, Shani G.
Effects of radiofrequency radiation emitted by cellular telephones on the cognitive functions of humans. Bioelectromagnetics. 27:119-126, 2006.
Eulitz, C, Ullsperger, P, Freude, G, Elbert ,T, Mobile phones modulate response patterns of human brain activity. Neuroreport 9(14):3229-3232, 1998.
Ferreri F, Curcio G, Pasqualetti P, De Gennaro L, Fini R, Rossini PM. Mobile phone emissions and human brain excitability. Ann Neurol. 60:188-196, 2006.
Fox E. Electrosensitivity symptoms associated with electromagnetic field exposure. Conference Presentation WHO International Workshop on Electrical Hypersensitivity, October 25-27, 2004, Prague, Czech Republic.
Freude, G, Ullsperger, P, Eggert, S, Ruppe, I, Effects of microwaves emitted by cellular phones on human slow brain potentials. Bioelectromagnetics 19(6):384-387, 1998.
Freude, G, Ullsperger, P, Eggert, S, Ruppe, I, Microwaves emitted by cellular telephones affect human slow brain potentials. Eur J Appl Physiol 81(1-2):18-27, 2000.
Galloni P, Lovisolo GA, Mancini S, Parazzini M, Pinto R, Piscitelli M, Ravazzani P, Marino C. Effects of 900 MHz electromagnetic fields exposure on cochlear cells' functionality in rats: Evaluation of distortion product otoacoustic emissions. Bioelectromagnetics. 26:536-547, 2005a.
Galloni P, Parazzini M, Piscitelli M, Pinto R, Lovisolo GA, Tognola G, Marino C, Ravazzani P. Electromagnetic Fields from Mobile Phones do not Affect the Inner Auditory System of Sprague-Dawley Rats. Radiat Res. 164(6):798-804, 2005b.
Garcia Callejo FJ, Garcia Callejo F, Pena Santamaria J, Alonso Castaneira I, Sebastian Gil E, Marco Algarra J. [Hearing level and intensive use of mobile phones] Acta

Otorrinolaringol Esp. 56(5):187-191, 2005.
Grisanti G, Parlapiano C, Tamburello CC, Tine G, Zanforlin L. Cellular phone effects on otoacoustic emissions. IEEE MTT-S Digest 2: 771-774, 1998.
Haarala C, Bjornberg L, Ek M, Laine M, Revonsuo A, Koivisto M, Hamalainen H. Effect of a 902 MHz electromagnetic field emitted by mobile phones on human cognitive function: A replication study. Bioelectromagnetics 24(4):283-288, 2003.
Haarala C, Ek M, Bjornberg L, Laine M, Revonsuo A, Koivisto M, Hamalainen H. 902 MHz mobile phone does not affect short term memory in humans. Bioelectromagnetics. 25(6):452-456, 2004.
Haarala C, Bergman M, Laine M, Revonsuo A, Koivisto M, Hamalainen H. Electromagnetic field emitted by 902 MHz mobile phones shows no effects on children's cognitive function. Bioelectromagnetics. Suppl 7:S144-150, 2005.
Haarala C, Takio F, Rintee T, Laine M, Koivisto M, Revonsuo A, Hamalainen H. Pulsed and continuous wave mobile phone exposure over left versus right hemisphere: Effects on human cognitive function. Bioelectromagnetics. 28:289-295, 2007.
Hamblin DL, Wood AW, Croft RJ, Stough C. Examining the effects of electromagnetic fields emitted by GSM mobile phones on human event-related potentials and performance during an auditory task. Clin Neurophysiol. 115(1):171-178, 2004.
Hamblin DL, Croft RJ, Wood AW, Stough C, Spong J. The sensitivity of human eventrelated
potentials and reaction time to mobile phone emitted electromagnetic fields. Bioelectromagnetics. 27:265-273, 2006.
Hietanen M, Kovala T, Hamalainen AM, Human brain activity during exposure to radiofrequency fields emitted by cellular phones. Scand J Work Environ Health 26(2):87-92, 2000.
Hietanen M, Hämäläinen A-M, Husman T. Hypersensitivity symptoms associated with exposure to cellular telephones: No causal link. Bioelectromagnetics 23:264-270, 2002.
Hinrichs H, Heinze HJ.Effects of GSM electromagnetic field on the MEG during an encoding-retrieval task. Neuroreport. 15(7):1191-1194, 2004.
Hladky, A, Musil, J, Roth, Z, Urban, P, Blazkova, V, Acute effects of using a mobile phone on CNS functions. Cent Eur J Public Health 7(4):165-167. 1999.
Hocking, B, Preliminary report: symptoms associated with mobile phone use. Occup Med (Lond);48(6):357-360, 1998.
Holmboe, G., Johansson, O, Symptombeskrivning samt förekomst av IgE och positiv Phadiatop Combi hos personer med funktionsnedsättningen elöverkänslighet. (Description of symptoms as well as occurrence of IgE and positive Phadiatop Combi in persons with the physical impairment electrohypersensitivity, in Swedish). Medicinsk Access 1:58–63, 2005.
Huber R, Graf T, Cote KA, Wittmann L, Gallmann E, Matter D, Schuderer J, Kuster N, Borbely AA, Achermann P, Exposure to pulsed high-frequency electromagnetic field during waking affects human sleep EEG. Neuroreport 11(15):3321-3325, 2000.
Huber R, Treyer V, Borbély AA, Schuderer J, Gottselig JM, Landolt H-P, Werth E, Berthold T, Kuster N, Buck A, Achermann P, Electromagnetic fields, such as those from mobile phones, alter regional cerebral blood flow and sleep and waking EEG. J Sleep Res 11: 289-295, 2002.
Huber R, Schuderer J, Graf T, Jutz K, Borbely AA, Kuster N, Achermann P. Radio frequency electromagnetic field exposure in humans: Estimation of SAR distribution in the brain, effects on sleep and heart rate. Bioelectromagnetics 24(4):262-276, 2003.
Huber R, Treyer V, Schuderer J, Berthold T, Buck A, Kuster N, Landolt HP, Achermann P. Exposure to pulse-modulated radio frequency electromagnetic fields affects regional cerebral blood flow. Eur J Neurosci. 21(4):1000-1006, 2005.

Hung CS, Anderson C, Horne JA, McEvoy P. Mobile phone 'talk-mode' signal delays EEG-determined sleep onset. Neurosci Lett. 2007 May 24; [Epub ahead of print]
Janssen T, Boege P, von Mikusch-Buchberg J, Raczek J. Investigation of potential effects of cellular phones on human auditory function by means of distortion product otoacoustic emissions. J Acoust Soc Am. 117(3 Pt 1):1241-1247, 2005.
Jech R, Sonka K, Ruzicka E, Nebuzelsky A, Bohm J, Juklickova M, Nevsimalova S. Electromagnetic field of mobile phones affects visual event related potential in patients with narcolepsy. Bioelectromagnetics 22(7):519-528, 2001.
Joubert V, Leveque P, Rametti A, Collin A, Bourthoumieu S, Yardin C. Microwave exposure of neuronal cells in vitro: Study of apoptosis. Int J Radiat Biol. 82(4):267-275, 2006.
Joubert V, Leveque P, Cueille M, Bourthoumieu S, Yardin C. No apoptosis is induced in rat cortical neurons exposed to GSM phone fields. Bioelectromagnetics. 28:115-121, 2007.
Keetley V, Wood AW, Spong J, Stough C. Neuropsychological sequelae of digital mobile phone exposure in humans. Neuropsychologia. 44:1843-1848, 2006.
Kellenyi, L, Thuroczy, G, Faludy, B, Lenard, L, Effects of mobile GSM radiotelephone exposure on the auditory brainstem response (ABR). Neurobiology 7:79-81, 1999.
Kerekhanjanarong V, Supiyaphun P, Naratricoon J, Laungpitackchumpon P. The effect of mobile phone to audiologic system. J Med Assoc Thai. 88 Suppl 4:S231-234, 2005.
Kizilay A, Ozturan O, Erdem T, Tayyar Kalcioglu M, Cem Miman M. Effects of chronic exposure of electromagnetic fields from mobile phones on hearing in rats. Auris Nasus Larynx. 30(3):239-245, 2003.
Koivisto, M, Revonsuo, A, Krause, C, Haarala, C, Sillanmaki, L, Laine, M, Hamalainen, H, Effects of 902 MHz electromagnetic field emitted by cellular telephones on response times in humans. Neuroreport 11(2):413-415, 2000a.
Koivisto M, Krause CM, Revonsuo A, Laine M, Hamalainen H, The effects of electromagnetic field emitted by GSM phones on working memory. Neuroreport 11(8):1641-1643, 2000b.
Koivisto M, Haarala C, Krause CM, Revonsuo A, Laine M, Hamalainen H, GSM phone signal does not produce subjective symptoms. Bioelectromagnetics 22(3):212-215, 2001.
Kramarenko AV, Tan U. Effects of high-frequency electromagnetic fields on human EEG: a brain mapping study. Int J Neurosci. 113(7):1007-1019, 2003.
Krause CM, Sillanmaki L, Koivisto M, Haggqvist A, Saarela C, Revonsuo A, Laine M, Hamalainen H, Effects of electromagnetic field emitted by cellular phones on the EEG during a memory task. Neuroreport 11(4):761-764, 2000.
Krause CM, Sillanmaki L, Koivisto M, Haggqvist A, Saarela C, Revonsuo A, Laine M, Hamalainen H, Effects of electromagnetic fields emitted by cellular phones on the electroencephalogram during a visual working memory task. Int J Radiat Biol 76(12):1659-1667, 2000.
Krause CM, Haarala C, Sillanmaki L, Koivisto M, Alanko K, Revonsuo A, Laine M, Hamalainen H. Effects of electromagnetic field emitted by cellular phones on the EEG during an auditory memory task: a double blind replication study. Bioelectromagnetics. 25(1): 33-40, 2004.
Krause CM, Bjornberg CH, Pesonen M, Hulten A, Liesivuori T, Koivisto M, Revonsuo A, Laine M, Hamalainen H. Mobile phone effects on children's event-related oscillatory EEG during an auditory memory task. Int J Radiat Biol. 82(6):443-450, 2006.
Krause CM, Pesonen M, Haarala Bjornberg C, Hamalainen H. Effects of pulsed and continuous wave 902 MHz mobile phone exposure on brain oscillatory activity during cognitive processing. Bioelectromagnetics. 28:296-308, 2007.
Lebedeva NN, Sulimov AV, Sulimova OP, Kotrovskaya TI, Gailus T,

Cellular phone electromagnetic field effects on bioelectric activity of human brain. Crit Rev Biomed Eng 28(1-2):323-337, 2000.
Lebedeva NN, Sulimov AV, Sulimova OP, Korotkovskaya TI, Gailus T, Investigation of brain potentials in sleeping humans exposed to the electromagnetic field of mobile phones. Crit Rev Biomed Eng 29(1):125-133, 2001.
Lee TMC, Ho SMY, Tsang LYH, Yang SYC, Li LSW, Chan CCH, Effect on human attention of exposure to the electromagnetic field emitted by mobile phones. Neuroreport 12:729-731, 2001.
Lee TM, Lam PK, Yee LT, Chan CC. The effect of the duration of exposure to the electromagnetic field emitted by mobile phones on human attention. Neuroreport. 14(10):1361-1364, 2003.
Lopez-Martin E, Relova-Quinteiro JL, Gallego-Gomez R, Peleteiro-Fernandez M, Jorge-Barreiro FJ, Ares-Pena FJ. GSM radiation triggers seizures and increases cerebral c-Fos positivity in rats pretreated with subconvulsive doses of picrotoxin. Neurosci Lett. 398:139-144, 2006.
Loughran SP, Wood AW, Barton JM, Croft RJ, Thompson B, Stough C. The effect of electromagnetic fields emitted by mobile phones on human sleep. Neuroreport. 16(17):1973-1976, 2005.
Maby E, Le Bouquin Jeannes R, Liegeois-Chauvel C, Gourevitch B, Faucon G. Analysis of auditory evoked potential parameters in the presence of radiofrequency fields using a support vector machines method. Med Biol Eng Comput. 42(4):562-568, 2004.
Maby E, Jeannes RL, Faucon G, Liegeois-Chauvel C, De Seze R. Effects of GSM signals on auditory evoked responses. Bioelectromagnetics. 26:341-350, 2005.
Maby E, Jeannes Rle B, Faucon G. Scalp localization of human auditory cortical activity modified by GSM electromagnetic fields. Int J Radiat Biol. 82(7):465-472, 2006.
Maier R, Greter SE, Maier N. Effects of pulsed electromagnetic fields on cognitive processes - a pilot study on pulsed field interference with cognitive regeneration. Acta Neurol Scand. 110(1):46-52, 2004.
Mann, K, Roschke, J, Effects of pulsed high-frequency electromagnetic fields on human sleep. Neuropsychobiology 33(1):41-47, 1996.
Mann, K, Roschke, J, Connemann, B, Beta, H, No effects of pulsed high-frequency electromagnetic fields on heart rate variability during human sleep. Neuropsychobiology 38(4):251-256, 1998.
Marino AA, Nilsen E, Frilot C. Nonlinear changes in brain electrical activity due to cell phone radiation. Bioelectromagnetics 24(5):339-346, 2003.
Marino C, Cristalli G, Galloni P, Pasqualetti P, Piscitelli M, Lovisolo GA , Effects of microwaves (900 MHz) on the cochlear receptor: exposure systems and preliminary results. Radiat Environ Biophys 39(2):131-136, 2000.
Mausset A, de Seze R, Montpeyroux F, Privat A. Effects of radiofrequency exposure on the GABAergic system in the rat cerebellum: clues from semi-quantitative immunohistochemistry. Brain Res 912(1):33-46, 2001.
Mausset-Bonnefont AL, Hirbec H, Bonnefont X, Privat A, Vignon J, de Seze R.Acute exposure to GSM 900-MHz electromagnetic fields induces glial reactivity and biochemical modifications in the rat brain. Neurobiol Dis. 17(3):445-454, 2004.
Meo SA, Al-Drees AM. Mobile phone related-hazards and subjective hearing and vision symptoms in the Saudi population. Int J Occup Med Environ Health. 18(1):53-57, 2005.
Monnery PM, Srouji EI, Bartlett J. Is cochlear outer hair cell function affected by mobile telephone radiation? Clin Otolaryngol 29(6):747-749, 2004.
Mora R, Crippa B, Mora F, Dellepiane M. A study of the effects of cellular telephone microwave radiation on the auditory system in healthy men. Ear Nose Throat J. 85(3):160, 162-163, 2006.
Oftedal G, Wilen J, Sandstrom M, Mild KH, Symptoms experienced in connection with

mobile phone use. Occup Med (Lond) 50(4):237-245, 2000.
Oftedal G, Straume A, Johnsson A, Stovner L. Mobile phone headache: a double blind, sham-controlled provocation study. Cephalalgia. 27:447-455, 2007.
Oktay MF, Dasdag S. Effects of intensive and moderate cellular phone use on hearing function. Electromagn Biol Med. 25(1):13-21, 2006.
Ozturan O, Erdem T, Miman MC, Kalcioglu MT, Oncel S. Effects of the electromagnetic field of mobile telephones on hearing. Acta Otolaryngol. 122(3):289-293, 2002.
Papageorgiou CC, Nanou ED, Tsiafakis VG, Capsalis CN, Rabavilas AD. Gender related differences on the EEG during a simulated mobile phone signal. Neuroreport. 15(16):2557-2560, 2004.
Papageorgiou CC, Nanou ED, Tsiafakis VG, Kapareliotis E, Kontoangelos KA, Capsalis CN, Rabavilas AD, Soldatos CR. Acute mobile phone effects on pre-attentive operation. Neurosci Lett. 397:99-103, 2006.
Parazzini M, Bell S, Thuroczy G, Molnar F, Tognola G, Lutman ME, Ravazzani P. Influence on the mechanisms of generation of distortion product otoacoustic emissions of mobile phone exposure. Hear Res. 208:68-78, 2005.
Pau HW, Sievert U, Eggert S, Wild W. Can electromagnetic fields emitted by mobile phones stimulate the vestibular organ? Otolaryngol Head Neck Surg. 132(1):43-49, 2005.
Preece, AW, Iwi, G, Davies-Smith, A, Wesnes, K, Butler, S, Lim, E, Varey, A, Effect of a 915-MHz simulated mobile phone signal on cognitive function in man. Int J Radiat Biol 75(4):447-456, 1999.
Preece AW, Goodfellow S, Wright MG, Butler SR, Dunn EJ, Johnson Y, Manktelow TC, Wesnes K. Effect of 902 MHz mobile phone transmission on cognitive function in children. Bioelectromagnetics. Suppl 7:s138-143, 2005.
Regel SJ, Negovetic S, Roosli M, Berdinas V, Schuderer J, Huss A, Lott U, Kuster N, Achermann P. UMTS Base Station-like Exposure, Well-Being, and Cognitive Performance. Environ Health Perspect. 114(8):1270-1275, 2006.
Roschke, J, Mann, K, No short-term effects of digital mobile radio telephone on the awake human electroencephalogram. Bioelectromagnetics 18(2):172-176, 1997.
Russo R, Fox E, Cinel C, Boldini A, Defeyter MA, Mirshekar-Syahkal D, Mehta A. Does acute exposure to mobile phones affect human attention? Bioelectromagnetics. 27:215-220, 2006.
Salford LG, Brun AR, Eberhardt JL, Malmgren L, Persson BRR, Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones. Environ Health Persp 111:881-883, 2003.
Sandstrom M, Wilen J, Oftedal G, Hansson Mild K, Mobile phone use and subjective symptoms. Comparison of symptoms experienced by users of analogue and digital mobile phones. Occup Med (Lond) 51(1):25-35, 2001.
Santini R, Seigne M, Bonhomme-Faivre L, Bouffet S, Defrasne E, Sage M. Symptoms experienced by users of digital cellular phones: a pilot study in a French engineering school. Pathol Biol (Paris) 49(3):222-226, 2001.
Santini R, Santini P, Danze JM, Le Ruz P, Seigne M.Study of the health of people living in the vicinity of mobile phone base stations: I. Influence of distance and sex. Pathol Biol (Paris) 50(6):369-373, 2002.
Schmid G, Sauter C, Stepansky R, Lobentanz IS, Zeitlhofer J. No influence on selected parameters of human visual perception of 1970 MHz UMTS-like exposure. Bioelectromagnetics. 26(4):243-250, 2005.
Sienkiewicz ZJ, Blackwell RP, Haylock RG, Saunders RD, Cobb BL, Low-level exposure to pulsed 900 MHz microwave radiation does not cause deficits in the performance of a spatial learning task in mice. Bioelectromagnetics 21(3):151-158, 2000.
Sievert U, Eggert S, Pau HW. Can mobile phone emissions affect auditory functions of cochlea or brain stem? Otolaryngol Head Neck Surg. 132(3):451-455, 2005.

Smythe JW, Costall B. Mobile phone use facilitates memory in male, but not female, subjects. Neuroreport 14(2):243-246, 2003.
Terao Y, Okano T, Furubayashi T, Ugawa Y. Effects of thirty-minute mobile phone use on visuo-motor reaction time. Clin Neurophysiol. 117:2504-2511, 2006.
Terao Y, Okano T, Furubayashi T, Yugeta A, Inomata-Terada S, Ugawa Y. Effects of thirty-minute mobile phone exposure on saccades. Clin Neurophysiol. 118:1545-1556, 2007.
Testylier G , Tonduli L, Malabiau R, Debouzy JC. Effects of exposure to low level radiofrequency fields on acetylcholine release in hippocampus of freely moving rats. Bioelectromagnetics 23:249-255, 2002.
Tsurita G, Nagawa H, Ueno S, Watanabe S, Taki M, Biological and morphological effects on the brain after exposure of rats to a 1439 MHz TDMA field. Bioelectromagnetics 21(5):364-371, 2000.
Uloziene I, Uloza V, Gradauskiene E, Saferis V. Assessment of potential effects of the electromagnetic fields of mobile phones on hearing. BMC Public Health. 5(1):39, 2005.
Urban, P, Lukas, E, Roth, Z, Does acute exposure to the electromagnetic field emitted by a mobile phone influence visual evoked potentials? A pilot study. Cent Eur J Public Health 6(4):288-290, 1998.
Vecchio F, Babiloni C, Ferreri F, Curcio G, Fini R, Del Percio C, Rossini PM. Mobile phone emission modulates interhemispheric functional coupling of EEG alpha rhythms. Eur J Neurosci. 25(6):1908-1913, 2007.
Von Klitzing, L, Low-frequency pulsed electromagnetic fields influence EEG of man. Phys. Medica 11:77-80, 1995.
Vorobyov V, Pesic V, Janac B, Prolic Z. Repeated exposure to low-level extremely low frequency-modulated microwaves affects baseline and scopolamine-modified electroencephalograms in freely moving rats. Int J Radiat Biol. 80(9):691-698, 2004.
Wagner, P, Roschke, J, Mann, K, Hiller, W, Frank, C, Human sleep under the influence of pulsed radiofrequency electromagnetic fields: a polysomnographic study using standardized conditions. Bioelectromagnetics 19(3):199-202, 1998.
Wagner P, Roschke J, Mann K, Fell J, Hiller W, Frank C, Grozinger M, Human sleep EEG under the influence of pulsed radio frequency electromagnetic fields. results from polysomnographies using submaximal high power flux densities. Neuropsychobiology 42(4):207-212, 2000.
Wang B, Lai H. Acute exposure to pulsed 2450-MHz microwaves affects water-maze performance of rats. Bioelectromagnetics. 21(1):52-56, 2000.
Wang Q, Cao ZJ, Bai XT. [Effect of 900 MHz electromagnetic fields on the expression of GABA receptor of cerebral cortical neurons in postnatal rats] Wei Sheng Yan Jiu. 34(5):546-548, 2005.
Wilen J, Sandstrom M, Hansson Mild K. Subjective symptoms among mobile phone users-A consequence of absorption of radiofrequency fields? Bioelectromagnetics 24(3):152-159, 2003.
Wilen J, Johansson A, Kalezic N, Lyskov E, Sandstrom M. Psychophysiological tests and provocation of subjects with mobile phone related symptoms. Bioelectromagnetics. 27:204-214, 2006.
Xu S, Ning W, Xu Z, Zhou S, Chiang H, Luo J. Chronic exposure to GSM 1800-MHz microwaves reduces excitatory synaptic activity in cultured hippocampal neurons. Neurosci Lett. 398:253-257, 2006.
Yamaguchi H, Tsurita G, Ueno S, Watanabe S, Wake K, Taki M, Nagawa H. 1439 MHz pulsed TDMA fields affect performance of rats in a T-maze task only when body temperature is elevated. Bioelectromagnetics 24(4):223-230, 2003.
Yuasa K, Arai N, Okabe S, Tarusawa Y, Nojima T, Hanajima R, Terao Y, Ugawa Y. Effects of thirty minutes mobile phone use on the human sensory cortex. Clin

Neurophysiol. 117:900-905, 2006.
Adair, E.R., 1983, "Microwaves and Thermoregulation," Academic Press, New York, NY.
Adey, W.R., 1988, The cellular microenvironment and signalling through cell membrane, *in*: "Electromagnetic fields and Neurobehavioral Functions," M.E. O'Connor and R.H. Lovely, eds., *Prog Clin Biol Res* 257:265-288.
Adey, W.R., Bawin, S.M. and Lawrence, A.F., 1982, Effects of weak amplitudemodulated
microwave fields on calcium efflux from awake cat cerebral cortex, *Bioelectromagnetics* 3:295-307.
Akyel, Y., Hunt, E.L., Gambrill, C., Varga, Jr. C., 1991, Immediate postexposure effects of high-peak-power microwave pulses on operant behavior of Wistar rats, *Bioelectromagnetics* 12:183-195.
Albert, E.N., 1977, Light and electron microscopic observations on the blood-brain barrier after microwave irradiation, *in*: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.G. Hazzard, ed., HEW Publication (FDA) 77-8026, Rockville, MD.
Albert, E.N., 1979a, Reversibility of microwave induced blood-brain barrier permeability, *Radio Sci* 14:323-327.
Albert, E.N., 1979b, Current status of microwave effects on the blood-brain barrier, *J Microwave Power* 14:281-285.
Albert, E.N., and DeSantis, M., 1975, Do microwaves alter nervous system structure? *Ann NY Acad Sci* 247:87-108.
Albert, E.N., and DeSantis, M., 1976, Histological observations on central nervous system, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.C. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Albert, E.N., and Kerns, J.M., 1981, Reversible microwave effects on the blood-brain barrier, *Brain Res* 230:153-164.
Albert, E.N., and Sherif, M., 1988, Morphological changes in cerebellum of neonatal rats exposed to 2.45 GHz microwaves, *in*: "Electromagnetic Fields and Neurobehavioral Functions," M.E. O'Connor and R.H. Lovely, eds., *Prog Clin Biol Res* 257: 135-151.
Albert, E.N., Sherif, M.F., and Papadopoulos, N-J., 1981a, Effects of non-ionizing radiation on the Purkinje cells of the uvula in squirrel monkey cerebellum, *Bioelectromagnetics* 2:241-246.
Albert, E.N., Sherif, M.F., Papadopoulos, N.J., Slaby, F.J., and Monahan, J., 1981b, Effect of nonionizing radiation on the Purkinje cells of the rat cerebellum, *Bioelectromagnetics* 2:247-257.
Altman, J., 1975, Effects of interference with cerebellar maturation on the development of locomotion: an experimental model of neurobehavioral retardation, *in*: "Brain Mechanisms in Mental Retardation," N.A. Buchwald and M.A.B. Brazier, eds., Academic Press, New York, NY.
Amir, S., Brown, Z.W., and Amit, Z., 1980, The role of endorphins in stress: evidence and speculations, *Neurosci Biobehav Rev* 4:77-86.
Arber, S.L., and Lin, J.C., 1985, Microwave-induced changes in nerve cells: effects of modulation and temperature, *Bioelectromagnetics* 6:257-270.
Ashani, Y., Henry, F.H., and Catravas, G.N., 1980, Combined effects of anticholinesterase
drugs and low-level microwave radiation, *Radiat Res* 84:469-503.
Atweh, S., Simon, J.R., and Kuhar, M.J., 1975, Utilization of the sodium-dependent highaffinity
choline uptake in vitro as a measure of activity of cholinergic neurons in vivo, *Life Sci* 17:1534-1544.
Baranski, S., 1972, Histological and histochemical effects of microwave irradiation on

the central nervous system of rabbits and guinea pigs, *Am J Physiol Med* 51:182-190.
Baranski, S., and Edelwejn, Z., 1968, Studies on the combined effects of microwaves and some drugs on bioelectric activity of the rabbit central nervous system, *Acta Physiol Polon*, 19:37-50.
Baranski, S., and Edelwejn, Z., 1974, Pharmacological analysis of microwave effects on the central nervous system in experimental animals, *in*: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Bawin, S.M., Gavalas-Medici, R.J., and Adey, W.R., 1973, Effects of modulated very high frequency fields on specific brain rhythms in cats, *Brain Res* 58:365-384.
Bawin, S.M., Kaczmarek, L.K., and Adey, W.R., 1975, Effects of modulated VHF fields on the central nervous system, *Annals NY Acad Sci* 247:74-81.
Bawin, S.M., Adey, W.R., and Sabbot, I.M., 1978, Ionic factors in release of 45Ca2+ from chicken cerebral tissue by electromagnetic fields, *Proc Nat'l Acad Sci USA* 75:6314-6318.
Benson, E.B., Lange, D.G., Fujimoto, J.M., and Ishi, T.K., 1983, Effects of acute microwave irradiation on phenobarbital sleep and disposition to brain in mice, *J Toxicol Environ Health* 11:261-274.
Bermant, R.I., Reeves, D.L., Levinson, D.M., and Justesen, D.R., 1979, Classical conditioning
of microwave-induced hyperthermia in rat, *Radio Sci* 14(6):201-207.
Blackman, C.F., Elder, J.A., Weil, C.M., Benane, S.G., Eichinger, D.C., and House, D.E., 1979, Induction of calcium-ion efflux from brain tissue by radio-frequency radiation: effects of modulation frequency and field strength, *Radio Sci* 14:93-98.
Blackman, C.F., Benane, S.G., Elder, J.A., House, D.E., Lampe, J.A., and Faulk, J.M., 1980a, Induction of calcium ion efflux from brain tissue by radiofrequency radiation: effect of sample number and modulation frequency on the power-density window, *Bioelectromagnetics* 1:35-43.
Blackman, C.F., Benane, S.G., Joines, W.T., Hollis, M.A., and House, D. E., 1980b, Calcium ion efflux from brain tissue: power density versus internal field-intensity dependencies at 50-MHz RF radiation, *Bioelectromagnetics* 1:277-283.
Blackman, C.F., Benane, S.G., House, D.E., and Joines, W.T., 1985, Effects of ELF (1-120 Hz) and modulated (50 Hz) RF field on the efflux of calcium ions from brain tissue, in vitro, *Bioelectromagnetics* 6:1-11.
Blackman, C.F., Benane, S.G., Elliot, D.J., House, D.E., and Pollock, M.M., 1988, Influence of electromagnetic fields on the efflux of calcium ions from brain tissue, in vivo: a three-model analysis consistent with the frequency response up to 510 Hz, *Bioelectromagnetics* 9:215-227.
Blackman, C.F., Kinney, L.S., House, D.E., and Joines, W.T., 1989, Multiple power density windows and their possible origin, *Bioelectromagnetics* 10:115-128.
Blackman, C.F., Benane, S.G., and House, D.E., 1991, The influence of temperature during electric and magnetic-field induced alteration of calcium-ion release from in vitro brain tissue, *Bioelectromagnetics* 12:173-182.
Blackwell, R.P., 1980, Effects of microwave exposure on anesthesia in the mouse, *in*: "Proceeding on the International Symposium on the Biological Effects of Electromagnetic Waves," UNSI, CNFRS, Jouy en Josas, France.
Blasberg, R.G., 1979, Problems of quantifying effects of microwave irradiation on the blood-brain barrier, *Radio Sci* 14(6):335-344.
Bolwig, T.G., 1988, Blood-brain barrier studies with special reference to epileptic seizure, *Acta Psychiatr Scand* 78(345):15-20.
Braestrup, C., and Squires, R.F. , 1978, Pharmacological characterization of benzodiazepine
receptors in the brain, *Eur J Pharmac* 48:263-270.

Braestrup, C., Neilsen, M., Neilsen, E.B., and Lyon, M., 1979, Benzodiazepine receptors in the brain as affected by different experimental stresses: the changes are small and not unidirectional, *Psychopharmacology* 65:273-277.
Bruce-Wolfe, V., and Justesen, D.R., 1985, Microwaves retard the anesthetic action of pentobarbital, *Abstr Ann Meeting Bioelectromagnetics Soc* 7:47.
Carroll, D.R., Levinson, D.M., Justesen, D.R., and Clarke, R.L., 1980, Failure of rats to escape from a potentially lethal microwave field, *Bioelectromagnetics* 1:101:115.
Catravas, C.N., Katz, J.B., Takenaga, J., and Abbott, J.R., 1976, Biochemical changes in the brain of rats exposed to microwaves of low power density (symposium summary), *J Microwave Power* 11:147-148.
Chamness, A.F., Scholes, H.R., Sexauer, S.W., and Frazer, J.W., 1976, Metal ion content of specific areas of the rat brain after 1600-MHz radiofrequency irradiation, *J Microwave power* 11:333-337.
Chang, B.K., Huang, A.T., Joines, W.T., and Kramer, R.S., 1982, The effect of microwave
radiation (1.0 GHz) on the blood-brain barrier, *Radio Sci* 17:165-168.
Chizhenkova, R.A., 1988, Slow potentials and spike unit activity of the cerebral cortex of rabbits exposed to microwaves, *Bioelectromagnetics* 9:337-345.
Chou, C.K. and Galambos, S.R., 1979, Middle ear structures contribute little to auditory perception of microwaves, *J Microwave Power* 14:321-326.
Chou, C.K. and Guy, A.W., 1978, Effects of electromagnetic fields on isolated nerve and muscle preparation, *IEEE Trans Microwave Th Tech* MTT-26:141-147.
Chou, C.K., and Guy, A.W., 1979a, Carbon-loaded Teflon electrodes for chronic EEG recordings in microwave research, *J Microwave Power* 14:399-404.
Chou, C.K. and Guy, A.W., 1979b, Microwave-induced auditory responses in guinea pigs: relationship of threshold and microwave-pulse duration, *Radio Sci* 14(6):193-197.
Chou, C.K., Galambos, R., Guy, A.W., and Lovely, R.H., 1975, Cochlear microphonics generated by microwave pulses, *J Microwave Power* 10:361-367.
Chou, C.K., Guy, A.W., and Galambos, R., 1982a, Auditory perception of radiofrequency
electromagnetic fields, *J Acoust Soc Am* 71:1321-1334.
Chou, C.K., Guy, A.W., McDougall, J.B., and Han, L.F., 1982b, Effects of continuous and pulsed chronic microwave exposure on rabbits, *Radio Sci* 17:185-193.
Chou, C.K., Guy, A.W., and Johnson, R.B., 1984, SAR in rats exposed in 2450-MHz circularly polarized waveguide, *Bioelectromagnetics* 5:389-398.
Chou, C.K., Guy, A.W., McDougall, J., and Lai, H., 1985a, Specific absorption rate in rats exposed to 2450-MHz microwaves under seven exposure conditions, *Bioelectromagnetics* 6:73-88.
Chou, C.K., Yee, K.C., and Guy, A.W., 1985b, Auditory response in rats exposed to 2450-MHz electromagnetic fields in a circularly polarized waveguide, *Bioelectromagnetics* 6:323-326.
Cotman, C.W., Brinton, R.E., Jalaburda, A., McEwen, B., and Schneider, D.M., eds., 1987, "The Neuro-Immune-Endocrine Connection," Raven Press, New York, NY.
Cunningham, C.L., Crabbe, J.C., and Rigter, H., 1984, Pavlovian conditioning of druginduced
changes in body temperature, *Pharmac Ther* 23:365-391.
Czerski, P., Ostrowski, K., Shore, M.L., Silverman, C.H., Sues, M.J., and Waldeskog, B., eds., 1974, "Biological Effects and Health Hazard of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publisher, Warsaw.
D'Andrea, J.A., Gandhi, O.P., and Kesner, R.P., 1976, Behavioral effects of resonant electromagnetic power absorption in rats, *in*: "Biological Effects of Electromagnetic Waves," vol 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-

8010, Rockville, MD.
D'Andrea, J.A., Gandhi, O.P., and Lords J.L., 1977, Behavioral and thermal effects of microwave radiation at resonant and nonresonant wavelengths, *Radio Sci* 12:251-256.
D'Andrea, J.A., Gandhi, O.P., Lords, J.L., Durney, C.H., Johnson, C.C., and Astle, L., 1979, Physiological and behavioral effects of chronic exposure to 2450-MHz microwaves, *J Microwave Power* 14:351-362.
D'Andrea, J.A., Gandhi, O.P., Lords. J.L., Durney, C.H., Astle, L., Stensaas, L.J., and Schoenberg, A.A., 1980, Physiological and behavioral effects of prolonged exposure to 915 MHz microwaves, *J Microwave Power* 15(2):123-135.
D'Andrea, J.A., DeWitt, J.R., Gandhi, O. P., Stensaas, S., Lords, J.L., and Nielson, H.C., 1986a, Behavioral and physiological effects of chronic 2450-MHz microwave irradiation of the rat at 0.5 mW/cm2, *Bioelectromagnetics* 7:45-56.
D'Andrea, J.A., DeWitt, J.R., Emmerson, R.Y., Bailey, C., Stensaas, S., and Gandhi, O. P., 1986b, Intermittent exposure of rat to 2450-MHz microwaves at 2.5 mW/cm2: behavioral and physiological effects, *Bioelectromagnetics* 7:315-328.
D'Andrea, J.A., Emmerson, R.Y., Dewitt, J.R., and Gandhi, O.P., 1987, Absorption of microwave radiation by the anesthetized rat: electromagnetic and thermal hotspots in body and tail, *Bioelectromagnetics* 8:385-396.
D'Andrea, J.A., Cobb, B.L., and de Lorge, J., 1989, Lack of behavioral effects in the rhesus monkey to high peak power microwave pulses at 1.3 GHz, *Bioelectromagnetics* 10:65-76.
da Silva, F.L., 1991, EEG analysis: theory and practice, *in*: "Electroencephalography: Basic Principles, Clinical Applications, and Related Fields," E. Niedermeyer and F.L. da Silva, eds., Urban and Schwargenberg, Baltimore, MD.
Dekker, A.J.A.M., Conner, D.J., and Thal, L.J., 1991, The role of cholinergic projections from the nucleus basalis in memory, *Neurosci Biobehav Rev* 15:299-317.
de Lorge, J.O., 1976, The effects of microwave radiation on behavior and temperature in rhesus monkeys, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
de Lorge, J.O., 1979, Operant behavior and rectal temperature of squirrel monkeys during 2.45-GHz microwave irradiation, *Radio Sci* 14(6):217-225.
de Lorge, J.O., 1985, Effects of microwaves on schedule-controlled behavior, *in*: "Behavioral Effects of Microwave Radiation Absorption," J.C. Monahan, and J.A. D'Andrea, eds., HHS Publication, FDA 85-8238, U.S. Government Printing Office, Washington, DC.
de Lorge, J., and Ezell, C.S., 1980, Observing-responses of rats exposed to 1.28- and 5.62-GHz microwaves, *Bioelectromagnetics* 1:183-198.
D'Inzeo, G., Bernardi, P., Eusebi, F., Grassi, F., Tamburello, C., and Zani, B.M., 1988, Microwave effects on acetylcholine-induced channels in cultured chick myotubes, *Bioelectromagnetics* 9:363-372.
Dumansky, J.D., and Shandala, M.G., 1974, The biologic action and hygienic significance
of electromagnetic fields of super high and ultra high frequencies in densely populated areas, *in*: "Biologic Effects and Health Hazard of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Dunn, A.J., 1989, Psychoneuroimmunology for the psychoneuroendocrinologist: a review of animal studies of nervous system-immune system interactions, *Psychoneuroendocrinology* 14:251-274.
Dutta, S.K., Subramoniam, A., Ghosh, B., and Parshad, R., 1984, Microwave radiationinduced
calcium ion efflux from human neuroblastoma cells in culture, *Bioelectromagnetics* 5:71-78.

Dutta, S.K., Ghosh, B., and Blackman, C.F., 1989, Radiofrequency radiation-induced calcium ion efflux enhancement from human and other neuroblastoma cells in culture, *Bioelectromagnetics* 10:197-202.
Dutta, S.K., Das, K., Ghosh, B., and Blackman, C.F., 1992, Dose dependence of acetylcholinesterase
activity in neuroblastoma cells exposed to modulated radiofrequency electromagnetic radiation, *Bioelectromagnetics* (In press).
Eikelboom, R., and Stewart, J., 1982, Conditioning of drug-induced physiological responses,
Psychol Rev 89:507-528.
Estevez, E.E., Jernsalinsky, D., Medina, J.H., and DeRobertis, E., 1984, Cholinergic muscarinic receptors in rat cerebral cortex, basal ganglia, and cerebellum undergo rapid and reversible changes after acute stress, *Neurosci* 13:1353-1357.
Finkelstein, Y., Koffler, B., Rabey, J.M., and Gilad, G.M., 1985, Dynamics of cholinergic
synaptic mechanisms in rat hippocampus after stress, *Brain Res* 343:314-319.
Fisher, L.A., 1989, Corticotropin-releasing factor: endocrine and automatic integration of responses to stress, *Trends Pharmac Sci* 10:189-193.
Frei, M.R., Jauchem, J.R., Padilla, J.M., and Merritt, J.H., 1989a, Thermal and physiological
responses of rats exposed to 2.45-GHz radiofrequency radiation: a comparison of E and H orientations, *Radiat Envir Biophys* 28:235-246.
Frei, M.R., Jauchem, J.R., and Padilla, J.M., 1989b, Thermal and physiological changes in rats exposed to CW and pulsed 2.8 GHz radiofrequency radiation in E and H orientations, *Int J Radiat Biol* 56:1033-1044.
Frey, A.H., 1961, Auditory system response to radio frequency energy, *Aerospace Med* 32:1140-1142.
Frey, A.H., 1977, Behavioral effects of electromagnetic energy, *in*: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.J. Hazzard, ed., HEW Publication (FDA), 77-8026, Rockville, MD.
Frey, A.H., and Feld, S.R., 1975, Avoidance by rats of illumination with low power nonionizing electromagnetic energy, *J Comp Physiol Psychol* 89:183-188.
Frey, A.H., and Wesler, L.S., 1983, Dopamine receptors and microwave energy exposure,
J Bioelectr 2:145-157.
Frey, A.H., Feld, S.R., and Frey, B., 1975, Neural function and behavior: defining the relationship. *Ann N Y Acad Sci* 247:433-439.
Gage, M.I., 1979a, Microwave irradiation and ambient temperature interact to alter rat behavior following overnight exposure, *J Microwave Power* 14:389-398.
Gage, M.I., 1979b, Behavior in rats after exposure to various power densities of 2450 MHz microwaves, *Neurobehav Toxicol* 1:137-143.
Galloway, W.D., 1975, Microwave dose-response relationship on two behavioral tasks, *Ann N Y Acad Sci* 247:410-416.
Galloway, W.D., and Waxler, M., 1977, Interaction between microwaves and neuroactive compounds, *in*: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.J. Hazzard, ed., HEW Publication (FDA) 77-8026, Rockville, MD.
Galvin, M.J., Parks, D.L., and McRee, D.L., 1981, Influence of 2.45 GHz microwave radiation on enzyme activity, *Radiat Environ Biophys* 19:149-156.
Galvin, M.J., Tilson, H.A., Mitchell, C.L., Peterson, J., and McRee, D.I., 1986, Influence of pre- and postnatal-exposure of rats to 2.45-GHz microwave radiation on neurobehavioral functions, *Bioelectromagnetics* 7:57-71.
Gandhi, C.R., and Ross, D.H., 1989, Microwave induced stimulation of 32 Pi-incorporation

into phosphoinositides of rat brain synaptosomes, *Radiat Environ Biophys* 28:223-234.
Gandhi, V.C., and Ross, D.H., 1987, Alteration in a-adrenergic and muscarinic cholinergic receptor binding in rat brain following nonionizing radiation, *Radiat Res* 109:90-99.
Garcia, J., and Koelling, R., 1966, Relation of cue to consequence in avoidance learning, *Psychonom Sci* 4:123-124.
Garcia, J., Ervin, F., and Koelling, R., 1966, Learning with prolonged delay of reinforcement, *Psychonom Sci* 5:121-122.
Goldman, H., Lin, J.C., Murphy, S., and Lin, M.F., 1984, Cerebrovascular permeability to Rb-86 in the rat after exposure to pulsed microwaves, *Bioelectromagnetics* 5:323-330.
Goldstein, L., and Sisko, Z., 1974, A quantitative electro-encephalographic study of the acute effect of X-band microwaves in rabbits, *in*: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Gordon, Z.V., 1970, Biological effects of microwaves in occupational hygiene, Israel Program for Scientific Translations, Jerusalem, Israel, NASA77F-633, TT70-50087:NTIS N71-14632.
Gregory, J.E., Iggo, A., McIntyre, A.K. and Proske, U., 1989a, Responses of electroreceptors in the platypus bill to steady and alternating potentials, *J Physiol* 408:391-404.
Gregory, J.E., Iggo, A., McIntyre, A.K. and Proske, U., 1989b, Response of electroreceptors in the snout of the echidna, *J Physiol* 414:521-538.
Grin, A.N., 1974, Effects of microwaves on catecholamine metabolism in brain, *US Joint Pub Research Device Rep* JPRS 72606.
Gruenau, S.P., Oscar, K.J., Folker, M.T., and Rapoport, S.I.,1982, Absence of microwave effect on blood-brain barrier permeability to 14C-sucrose in the conscious rat, *Exp Neurobiol* 75:299-307.
Guy, A.W., 1979, Miniature anechoic chamber for chronic exposure of small animals to plane wave microwave field, *J Microwave Power* 14:327-338.
Guy, A.W., Chou, C.K., Lin, J.C., and Christensen, D., 1975, Microwave-induced acoustic effects in mammalian auditory systems and physical materials, *Ann NY Acad Sci* 247:194-215.
Guy, A.W., Wallace, J., and McDougall, J.A., 1979, Circularly polarized 2450-MHz waveguide system for chronic exposure of small animals to microwaves, *Radio Sc*i 14(6):63-74.
Hecht, S., Schlaer, S., and Pirene, M.H., 1942, Energy, quanta, and vision, *J Gen Physiol* 25:819-840.
Hjeresen, D.L., Doctor, S.R., and Sheldon, R.L., 1979, Shuttlebox-side preference as mediated by pulsed microwaves and conventional auditory cue, *in*: "Electromagnetic Fields in Biological System," S.S.Stuchly, ed., Ottawa, Canada.
Hjeresen, D.L., Umbarger, K.O., and McElroy, J.F., 1987, Benzodiazepine receptor antagonist RO 15-1788 blocks the 2.45 GHz microwave attenuation of ethanolinduced hypothermia, *Abst Ann Meeting Bioelectromagnetics Soc* 9:25.
Hjeresen, D.L., Francendese, A., and O'Donnell, J.M., 1988, Microwave attenuation of ethanol-induced hypothermia: ethanol tolerance, time cause, exposure duration and dose response studies, *Bioelectromagnetics* 9:63-78.
Hjeresen, D.L., Francendese, A., and O'Donnell, J.M., 1989, Microwave attenuation of

ethanol-induced interactions with noradrenergic neurotransmitter systems, *Health Phys* 56:767-776.
Hruska, R.E., 1988, Effect of ethanol administration on striatal D1 and D2 dopamine receptors,
J Neurochem 50:1929-1933.
Hunt, E.L., King, N.W., and Phillips, R.D., 1975, Behavioral effects of pulsed microwave radiation, *Ann NY Acad Sci* 247:440-453.
Iggo, A., Gregory, J.E., and Proske, U., 1992, The central projection of electrosensory information in the platypus, *J Physiol* 447:449-465.
Jauchem, J.R., 1985, Effects of drugs on thermal responses to microwaves, *Gen Pharmacol* 16:307-310.
Jauchem, J.R., Frei, M.R., and Heinmets, F., 1983, Thermal bradycardia during radiofrequency
radiation, *Physiol Chem Phys* 15:429-434.
Jauchem, J.R., Frei, M.R., and Heinmets, F., 1984, Increased susceptibility to radiofrequency
radiation due to pharmacological agents, *Aviat Space Environ Med* 55:1036-1040.
Jauchem, J.R., Frei, M.R., and Heinmets, F., 1985, Effects of psychotropic drugs on thermal responses to radiofrequency radiation, *Aviat Space Environ Med* 56:1183-1188.
Jenkins, H.M., 1970, Sequential organization on schedules of reinforcement, *in*: "The Theory of Reinforcement Schedules," W.N. Schoenfeld, ed., Appleton-Century-Crofts, New York, NY.
Johnson, C.C., and Guy, A.W., 1972, Nonionizing electromagnetic wave effect in biological
materials and systems, *Proc IEEE* 60:692-718.
Johnson, R.B., Meyers, D.E., Guy, A.W., Lovely, R.H., and Galambos, R., 1976, Discriminative control of appetitive behavior by pulsed microwave radiation in rats, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-88010, Rockville, MD.
Johnson, R.B., Hamilton, J., Chou, C.K., and Guy, A.W., 1980, Pulsed microwave reduction
of diazepam-induced sleeping in the rat, *Abst Ann Meeting Bioelectromagnetrics Soc* 2:4.
Johnson, R.B., Spackman, D., Crowley, J., Thompson, D., Chou, C.K., Kunz, L.L., and Guy, A.W., 1983, Effects of long-term low-level radiofrequency radiation exposure on rats, vol. 4, Open field behavior and corticosterone, USAF SAM-TR83-42, Report of USAF School of Aerospace Medicine, Brooks AFB, San Antonio, TX.
Justesen, D.R., 1980, Microwave irradiation and blood-brain barrier, *Proc IEEE* 68:60-67.
Justesen, D.R., Levinson, D.M., and Justesen, L.R., 1973, Psychogenic stressors are potent mediators of the thermal response to microwave irradiation, *in*: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Kaplan, J., Polson, R., Rebert, C., Lunan, K., and Gage, M., l982, Biological and behavioral
effect of pre- and post-natal exposure to 2450 MHz electromagnetic radiation in the squirrel monkey, *Radio Sci* 171(5):135-144.
Katoh, A., Nabeshima, T., and Kameyama, T., 1990, Behavioral changes induced by stressful situation: effects of enkephalins, dynorphin, and their interaction, *J. Pharmac Exp Ther* 253:600-607.
Keane, B., and Leonard, B.E., 1989, Rodent models of alcoholism: a review, *Alcohol*

Alcoholism 24:299-309.
King, N.W., Justesen, D.R., and Clarke, R.L., 1971, Behavioral sensitivity to microwave irradiation, *Science* 172:398-401.
Kues, H.A., and Monahan, J.C., 1992, Microwave-induced changes to the primate eye, *Johns Hopkins APL Tech Digest* 13:244-254.
Kues, H.A., McLeod, D.S., Monahan, J.C., D'Anna, S.A., and Lutty, G.S., 1990, Retinal changes in the primate following pulsed 2.45-GHz exposures, *Abst Ann Meeting Bioelectromagnetics Soc* 12:22.
Kues, H.A., Monahan, J.C., D'Anna, S.A., McLeod, D.S., Lutty, G.A., and Koslov, S., 1992, Increased sensitivity of the non-human primate eye to microwave radiation following ophthalmic drug pretreatment, *Bioelectromagnetics* (In press).
Kuriyama, K., and Ohkuma, S., 1990, Alteration in the function of cerebral neurotransmitter
receptors during the establishment of alcohol dependence:
neurochemical aspects, *Alcohol Alcoholism* 25:239-249.
Lai, H., 1987, Acute exposure to noise affects sodium-dependent high-affinity choline uptake in the central nervous system of the rat, *Pharmac Biochem Behav* 28:147-151.
Lai, H., 1992, Research on the neurological effects of nonionizing radiation at the University of Washington, *Bioelectromagnetics* 13:513-526.
Lai, H., and Carino, M.A., 1990a, Effects of noise on high-affinity choline uptake in the frontal cortex and hippocampus of the rat are blocked by intracerebroventricular injection of corticotropin-releasing factor antagonist, *Brain Res* 527:354-358.
Lai, H., and Carino, M.A., 1990b, Acute white noise exposure affects the concentration of benzodiazepine receptors in the brain of the rat, *Pharmacol Biochem Behav* 36:985-987.
Lai, H., Carino, M.A., and Horita, A., 1980, Effects of ethanol on central dopamine functions, *Life Sci* 27:299-304.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1983, Psychoactive drug response is affected by acute low-level microwave irradiation, *Bioelectromagnetics* 4:205-214.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1984a, Acute low-level microwave irradiation
and the actions of pentobarbital: effects of exposure orientation, *Bioelectromagnetics* 5:203-212.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1984b, Low-level microwave irradiation affects ethanol-induced hypothermia and ethanol consumption, *Bioelectromagnetics* 5:213-220.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1984c, Microwave-induced postexposure hyperthermia: involvement of endogenous opioids and serotonin, *IEEE Trans Microwave Th Tech* MTT-32:882-886.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1986a., Low-level microwave irradiation attenuates naloxone-induced withdrawal syndrome in morphine-dependent rats, *Pharmac Biochem Behav* 24:151-153.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1986b, Effects of low-level microwave irradiation on amphetamine hyperthermia are blockable by naloxone and classically conditionable, *Psychopharmacology* 88:354-361.
Lai, H., Zabawska, J., and Horita, A., 1986c, Sodium-dependent, high-affinity choline uptake in hippocampus and frontal cortex of the rat affected by acute restraint stress, *Brain Res* 372:366-369.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1987a, A review of microwave irradiation
and actions of psychoactive drugs, *IEEE Eng Med Biol* 6(1):31-36.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1987b, Low-level microwave irradiation affects central cholinergic activity in the rat, *J Neurochem* 48:40-45.

Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1987c, Effects of low-level microwave irradiation on hippocampal and frontal cortical choline uptake are classically conditionable,
Pharmac Biochem Behav 27:635-639.
Lai, H., Horita, A., and Guy, A.W., 1988, Acute low-level microwave exposure and central cholinergic activity: studies on irradiation parameters, *Bioelectromagnetics*, 9:355-362.
Lai, H., Carino, M.A., Horita, A., and Guy, A.W., 1989a, Acute low-level microwave exposure and central cholinergic activity: a dose-response study, *Bioelectromagnetics*, 10:203-209.
Lai, H., Carino, M.A., and Guy, A.W., 1989b, Low-level microwave irradiation and central cholinergic systems, *Pharmac Biochem Behav* 33:131-138.
Lai, H., Carino, M.A., Horita, A., and Guy, A.W., 1990, Corticotropin-releasing factor antagonist blocks microwave-induced changes in central cholinergic activity in the rat, *Brain Res Bull* 25:609-612.
Lai, H., Carino, M.A., Wen, Y.F., Horita, A., and Guy, A.W., 1991, Naltrexone pretreatment
blocks microwave-induced changes in central cholinergic receptors, *Bioelectromagnetics* 12:27-33.
Lai, H., Carino, M.A., Horita, A., and Guy, A.W., 1992a, Single vs repeated microwave exposure: effects on benzodiazepine receptors in the brain of the rat, *Bioelectromagnetics* 13:57-66.
Lai, H., Carino, M.A., Horita, A., and Guy, A.W., 1992b, Opioid receptor subtypes mediating the microwave-induced decreases in central cholinergic activity in the rat, *Bioelectromagnetics* 13:237-247.
Lai, H., Horita, A., and Guy, A.W., 1993, Microwave irradiation affects radial-arm maze performance in the rat, *Bioelectromagnetics* (In press).
Lange, D.G., and Sedmak, J., 1991, Japanese encephalitis virus (JEV): potentiation of lethality in mice by microwave radiation, *Bioelectromagnetics* 12:335-348.
Le, A.D., Poulos, C.K., and Cappell, H., 1979, Conditioned tolerance to the hypothermic effect of ethyl alcohol, *Science* 206:1109-1110.
Lebovitz, R.M., 1980, Behavioral changes during long-term microwave irradiation, *in*: "Proceeding of the International Symposium on the Biological Effects of Electromagnetic waves," UNSI, CNFRS, Jouy-en-Josas, France.
Lebovitz, R.M., and Seaman, R.L., 1977a, Microwave hearing: the responses of single auditory neurons in the cat to pulsed microwave radiation, *Radio Sci* 12(6):229-236.
Lebovitz, R.M., and Seaman, R.L., 1977b, Single auditory unit responses to weak, pulsed microwave radiation, *Brain Res* 126:370-375.
Levin, E.D., 1988, Psychopharmacological effects in the radial-arm maze, *Neurosci Biobehav Rev* 12:169-175.
Levinson, D.M., Grove, A.M., Clarke, L.R., and Justesen, D.R., 1982, Photic cuing of escape by rats from an intense microwave field, *Bioelectromagnetics* 3:105-116.
Liebman, P.A., Parker, K.R., and Dratz, E.A., 1987, The molecular mechanism of visual excitation and its relation to the structure and function of the rod outer segment, *Ann Rev Physiol* 49:765-791.
Lin, J.C., 1978, "Microwave Auditory Effects and Applications," Charles C. Thomas, Springfield, IL.
Lin, J.C. and Lin, M.F., 1980, Studies on microwaves and blood-brain barrier interaction, *Bioelectromagnetics* 1:313-323.
Lin, J.C. and Lin, M.F., 1982, Microwave hyperthermia-induced blood-brain barrier alterations, *Radiat Res* 89:77-87.
Lin-Liu, S., and Adey, W.R., 1982, Low frequency amplitude modulated microwave fields change calcium efflux rate from synaptosomes, *Bioelectromagnetics* 3:309-322.

Lippa, A.S., Klepner, C.A., Yunger, L., Sano, M.C., Smith, W.V., and Beer, B., 1978, Relationship between benzodiazepine receptors and experimental anxiety in rats, *Pharmac Biochem Behav* 9:853-856.
Lobanova, Ye. A., 1974a, Investigation on the susceptibility of animal to microwave irradiation
following treatment with pharmacologic agents, *in*: "Biological Effects of Radiofrequency Electromagnetic Fields," Z.V. Gordon, ed., NTIS:JPRS 63321.
Lobanova, Ye. A., 1974b, The dependence of the temperature response to microwave irradiation
and the initial functional state of the CNS, *in*: "Biological Effects of Radiofrequency Electromagnetic Fields," Z.V. Gordon, ed., NTIS:JPRS 63321.
Lovely, R.H., and Guy, A.W., 1975, Conditioned taste aversion in the rat induced by a single exposure to microwave, paper presented at the IMPI Microwave Power Symposium, University of Waterloo, Waterloo, Ontario, Canada.
Lovely, R.H., Myers, D.E., and Guy, A.W., 1977, Irradiation of rats by 918-MHz microwaves at 2.5 mW/cm2: delineating the dose-response relationship, *Radio Sci* 12(6):139-146.
Lu, S.T., Lotz, W.G., and Michaelson, S.M., 1980, Advances in microwave-induced neuroendocrine effects: the concept of stress, *Proc IEEE* 68:73-77.
Lucchi, L., Moresco, R.M., Govoni, S., and Trabucchi, M., 1988, Effect of chronic ethanol treatment on dopamine receptor subtypes in rat striatum, *Brain Res* 449:347-351.
Mansour, A., Khachaturian, H., Lewis, M.E., Akil, H., and Watson, S.J., 1987, Autoradiographic differentiation of mu, delta, and kappa opioid receptors in the rat forebrain, *J Neurosci* 7:2445-2464.
Mackintosh, N.J., 1974, "The Psychology of Animal Learning," Academic Press, New York, NY.
Marr, M.J., de Lorge, J.O., Olsen, R.G., and Stanford, M., 1988, Microwaves as reinforcing events in a cold environment, *in*: "Electromagnetic Fields and Neurobehavioral Functions," M.E. O'Connor and R.H. Lovely, eds., *Prog Clin Biol Res* 257:219-234.
McAfee, R.D., 1961, Neurological effect of 3 cm microwave radiation, *Am J Physiol* 200: 192-199.
McAfee, R.D., 1963, Physiological effects of thermode and microwave stimulation of peripheral nerves, *Am J Physiol* 203: 374-380.
McKee., A., Dorsey, C.H., Eisenbrandt, D.L., and Woden, 1980, Ultrastructural observations of microwave-induced morphologic changes in the central nervous system of hamster, *Bioelectromagnetics* 1:206.
McRee, D.J., and Davis, H.G., 1984, Whole-body and local dosimetry on rats exposed to 2.45-GHz microwave radiation, *Health Phys* 46:315-320.
Medina, J.H., Novas, M.L., and DeRobertis, E., 1983a, Changes in benzodiazepine receptors
by acute stress: different effects of chronic diazepam on R015-1788 treatment, *Eur J Pharmacol* 96:181-185.
Medina, J.H., Novas, M.L., Wolfman, C.N.V., Levi DeStein, M., and DeRobertis, E., 1983b, Benzodiazepine receptors in rat cerebral cortex and hippocampus undergo rapid and reversible changes after acute stress, *Neurosci* 9:331-335.
Merritt, J.H., Hartzell, R.H., and Frazer, J.W., 1976, The effect of 1.6 GHz radiation on neurotransmitters in discrete areas of the rat brain, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.C. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Merritt, J.H., Chamness, A.F., Hartzell, R.H., and Allan, S.J., 1977, Orientation effect on microwave-induced hyperthermia and neurochemical correlates, *J Microwave Power* 12:167-172.

Merritt, J.H., Chamness, A.F., and Allens, S.J., 1978, Studies on blood-brain barrier permeability after microwave radiation, *Radiat Environ Biophys* 15:367-377.
Merritt, J.H., Shelton, W.W., and Chamness, A.F., 1982, Attempts to alter 45Ca2+ binding to brain tissue with pulse-modulated microwave energy, *Bioelectromagnetics* 3:475-478.
Michaelson, S.M. and Lin, J.C., 1987, "Biological Effects and Health Implications of Radiofrequency Radiation," Plenum Press, New York, NY.
Michaelson, S.M., Thomson, R.A.E., and Howland, J.W., 1961, Physiological aspects of microwave irradiation of mammals, *Am J Physiol* 201:351-356.
Miller, D.B., Christopher, J.P., Hunter, J., and Yeandle, S.S., 1984, The effect of exposure
of acetylcholinesterase to 2450 MHz microwave radiation, *Bioelectromagnetics* 5:165-172.
Mitchell, C.L., McRee, D.J., Peterson, N.J., and Tilson, H.A., 1988, Some behavioral effects of short-term exposure of rats to 2.45-GHz microwave radiation, *Bioelectromagnetics* 9:259-268.
Mitchell, D.S., Switzer, W.G., and Bronaugh, E.L., 1977, Hyperactivity and disruption of operant behavior in rats after multiple exposure to microwave radiation, *Radio Sci* 12(6):263-271.
Mizukawa, K., Takayama, H., Sato, H., Ota, J., Haba, K., and Ogawa, N., 1989, Alterations of muscarinic cholinergic receptors in the hippocampal formation of stressed rat: in vitro quantitative autoradiographic analysis, *Brain Res* 478:187-192.
Modak, A.T., Stavinoha, W.B., and Dean, U.P., 1981, Effect of short electromagnetic pulses on brain acetylcholine content and spontaneous motor activity in mice, *Bioelectromagnetics* 2:89-92.
Moe, K.E., Lovely, R.H., Meyers D.E., and Guy, A.W., 1976, Physiological and behavioral
effects of chronic low-level microwave radiation in rats, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Mohler, H., and Okada, T., 1977, Benzodiazepine receptor: demonstration in the central nervous system, *Science* 198:849-851.
Monahan, J.C., 1988, Microwave-drug interactions in the cholinergic nervous system of the mouse, *in*: "Electromagnetic Fields and Neurobehavioral Function," M.E. O'Connor and D.H. Lovely, eds., *Prog Clin Biol Res* 257:309-326.
Monahan, J.C., and Henton, W., 1977a, Microwave absorption and taste aversion as a function of 915 MHz radiation, *in*: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.J. Hazzard, ed., HEW Publication (FDA) 77-8026, Rockville, MD.
Monahan, J.C., and Henton, W., 1977b, Free-operant avoidance and escape from microwave
radiation, *in*: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.J. Hazzard, ed., HEW Publication (FDA) 77-8026, Rockville, MD.
Monahan, J.C., and Henton, W., 1979, The effect of psychoactive drugs on operant behavior induced by microwave radiation, *Radio Sci* 14(6):233-238.
Monahan, J.C., and Ho, H., 1976, Microwave-induced avoidance behavior in the mouse, *in*: "Biological Effects of Electromagnetic Waves, Selected Papers of the USNC/URSI Annual Meeting," vol . 1, C.C. Johnson and M.L. Shore , eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Mowrer, W.H., 1939, A stimulus-response analysis of anxiety and its role as a reinforcing agent, *Pychol Rev* 46:553-565.
Muller, P., Britton, R.S., and Seeman, P., 1980, The effect of long-term ethanol on brain receptors for dopamine, acetylcholine, seratonin and noradrenaline, *Eur J*

Pharmacol 65:31-37.
Neilly, J.P. and Lin, J.C., 1986, Interaction of ethanol and microwaves on the blood-brain barrier of rats, *Bioelectromagnetics* 7:405-414.
Neubauer, C., Phelan, A.M., Kues, H., and Lange, D.G., 1990, Microwave irradiation of rats at 2.45 GHz activates pinocytotic-like uptake of tracer by capillary endothelial cells of cerebral cortex, *Bioelectromagnetics* 11:261-268.
Nichols, M.L., Hubbell, C.L., Kalsher, M.J., and Reid, L.D., 1991, Morphine increases intake of beer among rats, *Alcohol* 8:237-240.
O'Connor, M.E., 1988, Prenatal microwave exposure and behavior, *in*: "Electromagnetic Fields and Neurobehavioral Function," M.E. O'Connor and R.H. Lovely, eds., *Prog Clin Biol Res* 257:265-288.
Oscar, K.J. and Hawkins, T.D., 1977, Microwave alteration of the blood-brain barrier system of rats, *Brain Res* 126:281-293.
Oscar, K.J., Gruenace, S.P., Folker, M.T., and Rapoport S.L., 1981, Local cerebral blood flow after microwave exposure, *Brain Res* 204:220-225.
Overstreet, D.H., and Yamamura, H., 1979, Receptor alteration and drug tolerance, *Life Sci* 25:1865-1878.
Panksepp, J., Zolovick, A.J., Jalowiec, J.E., Stern, W.C., and Morgane, P.J., 1973, Fenfluramine: effects on aggression, *Biol Psychiat* 6:181-186.
Pappas, B.A., Anisman, H., Ings, R., and Hill, D.A., 1983, Acute exposure to pulsed microwaves affects neither pentylenetetrazol seizures in the rat nor cholordiazepoxide protection against such seizures, *Radiat Res* 96:486-496.
Pickard, W.F., and Barsoum, Y.M., 1981, Radiofrequency bioeffects at the membrane level: separation of thermal and athermal contributions in the Characeae, *J Membrane Biol* 61:39-54.
Plotnikoff, N., Murgo, A., Faith, R., and Wybran, J., eds., 1991, "Stress and Immunity," CRC Press, Boca Raton, FL.
Polc, P., 1988, Electrophysiology of benzodiazepine receptor ligands: multiple mechanisms
and sites of action, *Prog Neurobiol* 31:349-424.
Preston, E., and Prefontaine, G., 1980, Cerebrovascular permeability to sucrose in the rat exposed to 2450-MHz microwaves, *J Appl Physiol* 49:218-223.
Preston, E., Vavasour, E.J., and Assenheim, H.M., 1979, Permeability of the blood-brain barrier to mannitol in the rat following 2450 MHz microwave irradiation, *Brain Res* 174:109-117.
Price, D.L., Cork, L.C., Struble, R.G., Whitehouse, P.J., Kitt, C.A., and Walker, L.C., 1985, The functional organization of the basal forebrain cholinergic systems in primates and the role of the system in Alzheimer's disease, *Ann N Y Acad Sci* 444:287-295.
Quock, R.M., Fujimoto, J.M., Ishii, T.K., and Lange, D.G., 1986a, Microwave facilitation of methylatropine antagonism of central cholinomimetic drug effects, *Radiat Res* 105:328-340.
Quock, R.M., Konchich, F.J., Ishii, T.K. and Lange, D.G., 1986b, Microwave facilitation of methylatrophine antagonism of morphine-induced analgesic in mice, *J Bioelectricity* 5:35-46.
Quock, R.M., Konchich, F.J., Ishii, T.K., and Lange, D.G., 1987, Microwave facilitation of domperidone antagonism of apomorphine-induced stereotypic climbing in mice, *Bioelectromagnetics* 8:45-55.
Quock, R.M., Bixby, R.R., Klauenberg, B.J., and Merritt, J.H., 1990, Influence of microwave exposure on chlordiazepoxide effects in the mouse staircase test, *Abst Ann Meeting Bioelectromagnetics Soc* 12:92.
Reid, L.D., Delconte, J.D., Nichols, M.L., Bilsky, E.J., and Hubbell, C.L., 1991, Tests of opioid deficiency hypothesis of alcoholism, *Alcohol* 8:247-257.
Reynolds, G.S., 1968, "Primer of Operant Conditioning," Scott & Foreman, Glenview,

IL.
Roberti, B., Heebels, G.H., Hendricx, J.C.M., deGreef, A.H.A.M., and Wolthuis, O.L., 1975, Preliminary investigation of the effect of low-level microwave radiation on spontaneous motor activity in rats, *Ann NY Acad Sci* 247:417-424.
Rudnev, M., Bokina, A., Eksler, N., and Navakatikyan, M., 1978, The use of evoked potential and behavioral measures in the assessment of environmental insult *in*: "Multidisciplinary Perspectives in Event-Related Brain Potential Research," D.A. Otto, ed., EPA-600/9-77-043, U.S. Environmental Protection Agency, Research Triangle Park, NC.
Sagan, P.M., and Medici, R.G., 1979, Behavior of chicks exposed to low-power 450-MHz fields sinusoidally modulated at EEG frequencies, *Radio Sci* 14(6):239-245.
Sanders, A.P., and Joines, W.T., 1984, The effects of hyperthermia and hyperthermia plus microwaves on rat brain energy metabolism, *Bioelectromagnetics* 5:63-70.
Sanders, A.P., Schaefer, D.J., and Joines, W.T., 1980, Microwave effects on energy metabolism of rat brain, *Bioelectromagnetics* 1:171-182.
Sanders, A.P., Joines, W.T., and Allis, J.W., 1984, The differential effect of 200, 591, and 2450 MHz radiation on rat brain energy metabolism, *Bioelectromagnetics* 5:419-433.
Sanders, A.P., Joines, W.T., and Allis, J.W., 1985, Effect of continuous-wave, pulsed, and sinusoidal-amplitude-modulated microwaves on brain energy metabolism, *Bioelectromagnetics* 6:89-97.
Sanza, J.N., and de Lorge, J., 1977, Fixed interval behavior and rats exposed to microwaves
at low power densities, *Radio Sci* 12(6):273-277.
Scheich, H., Langner, G., Tidemann, C., Coles, R.B., and Guppy, A., 1986, Electroreception
and electrolocation in platypus, *Nature* 319:401-402.
Scholl, D.M., and Allen, S.J., 1979, Skilled visual-motor performance by monkeys in a 1.2-GHz microwave field, *Radio Sci* 14(6): 247-252.
Schrot, J., Thomas, J.R., and Banvard, R.A., 1980, Modification of the repeated acquisition
of response sequences in rats by low-level microwave exposure, *Bioelectromagnetics* 1:89-99.
Schwan, H.P., 1971, Interaction of microwave and radiofrequency radiation with biological
systems, *IEEE Microwave Th Tech* MTT-19:146-150.
Schwan, H.P., 1977, Electrical membrane potentials, tissue excitation, and various relevant
interpretations, *in*: "Biologic Effects of Electric and Magnetic Fields Associated with Proposed Project Seafarer," National Academy of Sciences, Washington, DC.
Seaman, R.L., and Lebovitz, R.M., 1987, Auditory unit responses to single pulse and twin-pulse microwave stimuli, *Hearing Res* 26:105-116.
Seaman, R.L., and Lebovitz, R.M., 1989, Thresholds of cat cochlea nucleus neurons to microwave pulses, *Bioelectromagnetics* 10:147-160.
Seaman, R.L., and Wachtel, H., 1978, Slow and rapid responses to CW and pulsed microwave radiation by individual Aplysia pacemakers, *J Microwave Power* 13:77-86.
Servantie, B., Batharion, G., Joly, R., Servantie, A.M., Etienne, J., Dreyfus, P., and Escoubet, P., 1974, Pharmacologic effects of a pulsed microwave field, *in*: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Servantie, B., Servantie, A.M., and Etienne, J., 1975, Synchronization of cortical neurons

by a pulsed microwave field as evidenced by spectral analysis of electrocorticograms from the white rat, *Ann N Y Acad Sci* 247:82-86.
Shandala, M.G., Dumanski, U.D., Rudnev, M.I., Ershova, L.K., and Los, I.P., 1979, Study of nonionizing microwave radiation effects upon the central nervous system and behavior reaction, *Environ Health Perspect* 30:115-121.
Shelton, W.W., Jr., and Merritt, J.H., 1981, In vitro study of microwave effects on calcium
efflux in rat brain tissue, *Bioelectromagnetics* 2:161-167.
Sheppard, A.R., Bawin, S.M., and Adey, W.R., 1979, Models of long-range order in cerebral macro-molecules: effect of sub-ELF and of modulated VHF and UHF fields, *Radio Sci* 14:141-145.
Siegel, S., 1977, Morphine tolerance acquisition as an associative process, *J Comp Physiol Psychol* 3:1-13.
Siegel, S., Hinson, R.E., Krank, M.D., and McCully, J., 1982, Heroin "overdose" death: contribution of drug-associated environmental cues, *Science* 216:436-437.
Snyder, S.H., 1971, The effect of microwave irradiation on the turnover rate of serotonin and norepinephrine and the effect of microwave metabolizing enzymes, Final Report, Contract No. DADA 17-69-C-9144, U.S. Army Medical Research and Development Command, Washington, DC (NTLT AD-729 161).
Solomon, R.L., and Wynne, L.C., 1954, Traumatic avoidance learning: the principles of anxiety conservation and partial irreversibility, *Psychol Rev* 61:353-385.
Soubrie, P., Thiebot, M.H., Jobert, A., Montastruc, J.L., Hery, F., and Hamon, M., 1980, Decreased convulsant potency of picotoxin and pentetrazol and enhanced [3H] flunitrazepam cortical binding following stressful manipulations in rat, *Brain Res* 189:505-519.
Stavinoha, W.B., Medina, M.A., Frazer, J., Weintraub, S.T., Ross, D.H., Modak, A.T., and Jones, D.J., 1976, The effects of 19 megacycle irradiation on mice and rats, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Steriade, M., and Biesold, D. eds., 1990, "Brain Cholinergic Systems," Oxford University Press, Oxford.
Stern, S., 1980, Behavioral effects of microwaves, *Neurobehav Toxicol* 2:49-58.
Stverak, I., Martha, K., and Pafkova, G., 1974, Some effects of various pulsed field on animals with audiogenic epilepsy, *in*: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Stryer, L., 1987, The molecules of visual excitation, *Scientific American* 257(1):32-40.
Sutton, C.H., and Carroll, F.B., 1979, Effects of microwave-induced hyperthermia on the blood-brain barrier of the rat, *Radio Sci* 14:329-334.
Switzer, W.G., and Mitchell, D.S., 1977, Long-term effects of 2.45 GHz radiation on the ultrastructure of the cerebral cortex and hematologic profiles of rats, *Radio Sci* 12:287-293.
Syvalahti, E.K.G., Hietala, J., Roytta, M., and Gronroos, J., 1988, Decrease in the number of rat brain dopamine and muscarinic receptors after chronic alcohol intake, *Pharmacol Toxicol* 62:210-212.
Tabakoff, B., and Hoffman, P.L., 1979, Development of functional dependence on ethanol in dopaminergic systems, *J Pharmacol Exp Ther* 208:216-222.
Takashima, S., Onaral, B., and Schwan, H.P., 1979, Effects of modulated RF energy on the EEG of mammalian brain, *Rad Environ Biophys* 16:15-27.
Taylor, E.M., and Ashleman, B.T., 1974, Analysis of central nervous system involvement in the microwave auditory effect, *Brain Res* 74:201-208.
Taylor, E.M., and Ashleman, B.T., 1975, Some effects of electromagnetic radiation on the brain and spinal cord of cats, *Ann NY Acad Sci* 247:63-73.

Thomas, J.R., and Maitland, G., 1979, Microwave radiation and dextroamphetamine: evidence
of combined effects on behavior of rats, *Radio Sci* 14(6):253-258.
Thomas, J.R., Finch, E.D., Fulk, D.W., and Burch, L.S., 1975, Effects of low level microwave radiation on behavioral baselines, *Ann NY Acad Sci* 247:425-432.
Thomas, J.R., Yeandle, S.S., and Burch, L.S., 1976, Modification of internal discriminative
stimulus control of behavior by low levels of pulsed microwave radiation, *in*: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L.Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Thomas, J.R., Burch, L.S., and Yeandle, S.C., 1979, Microwave radiation and chlordiazepoxide:
synergistic effects on fixed interval behavior, *Science* 203:1357-1358.
Thomas, J.R., Schrot, J., and Banvard, R.A., 1980, Behavioral effects of chlorpromazine and diazepam combined with low level microwaves, *Neurobiol* 2:131-135.
Tolgskaya, M.S., and Gordon, Z.V., 1973, Pathological effects of radiowaves, (Translated from Russian by B. Haigh), Consultants Bureau, New York, NY.
Wachtel, H., Seaman, R., and Joines, W., 1975, Effects of low-intensity microwaves on isolated neurons, *Ann NY Acad Sci* 247:46-62.
Wangemann, R.T., and Cleary, S.F., 1976, The in vivo effects of 2.45-GHz microwave radiation on rabbit serum components and sleeping times, *Radiat Environ Biophys* 13:89-103.
Ward, T.R., Elder, J.A., Long, M.D., and Svendsgaard, D., 1982, Measurement of bloodbrain
barrier permeation in rats during exposure to 2450-MHz microwaves, *Bioelectromagnetics* 3:371-383.
Ward, T.R., and Ali, J.S., 1985, Blood-brain barrier permeation in the rat during exposure to low-power 1.7-GHz microwave radiation, *Bioelectromagnetics* 2:131-143.
Ward, T.R., Svensgaard, D.J., Spiegel, R.J., Puckett, E.T., Long, M.D., and Kinn, J.B., 1986, Brain temperature measurements in rats: a comparison of microwave and ambient temperature exposures, *Bioelectromagnetics* 7:243-258.
Weizman, R., Weizman, A., Kook, K.A., Vocci, F., Deutsch, S.I., and Paul, S.M., 1989, Repeated swim stress alters brain benzodiazepine receptors measured in vivo, *J Pharmacol Exp Ther* 249:701-707.
Wild, K.D., and Reid, L.D., 1990, Modulation of ethanol-intake by morphine: evidence for a central site of action, *Life Sci* 47:PL-49-PL-54.
Williams, W.M., Hoss, W., Formaniak, M., and Michaelson, S.M., 1984a, Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules, A. Effect on the permeability to sodium fluorescein, *Brain Res Rev* 7:165-170.
Williams, W.M., del Cerro, M., and Michaelson, S.M., 1984b, Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules, B. Effect on the permeability to HRP, *Brain Res Rev* 7: 171-181.
Williams, W.M., Platner, J., and Michaelson, S.M., 1984c, Effect of 2450 MHz microwave
energy on the blood-brain barrier to hydrophilic molecules, C. Effect on the permeability to 14C-sucrose, *Brain Res Rev* 7:183-190.
Williams, W.M., Lu, S.-T., del Cerro, M., and Michaelson, S.M., 1984d, Effect of 2450 MHz microwave energy on the blood-brain barrier to hydrophilic molecules, D. Brain temperature and blood-brain barrier permeability to hydrophilic tracers, *Brain Res Rev* 7:191-212.
Wikler, A., 1973a, Dynamics of drug dependence: Implications of a conditioning theory for research and treatment, *Arch Gen Psychiat* 28:611-616.
Wikler, A., 1973b, Conditioning of successive adaptive responses to the initial effects of drugs, *Conditioned Reflex* 8:193-210.

Wilson, B.A., Zook, J.M., Joines, W.T., and Casseday, J.H., 1980, Alterations in activity at auditory nuclei of the rat induced by exposure to microwave radiation: autoradiographic
evidence using [14C]-2-deoxy-D-glucose, *Brain Res* 187:291-306.
Woods, S.C., Makous, W., and Hutton, R.A., 1969, Temporal parameters of conditioned hypoglycemia, *J Comp Physiol Psychol* 69:301-307.
Young, W., 1980, The effect of microwaves (9.7 GHz) on membrane bound acetylcholinesterase
in the vagal heart system, *Fed Proc* 39:410.
Zeman, G.H., Chaput, R.L., Glazer, Z.R., and Gershman, L.L., 1973, Gammaaminobutyric
acid metabolism in rats following microwave exposure. *J Microwave Power* 8:213-216.
Akyel, Y., Hunt, E.L., Gambrill, C., and Varga, C. Jr., 1991, Immediate postexposure effects of high-peak-power microwave pulses on operant behavior of Wistar rats, Bioelectromagnetics 12:183-195.
Barenski, S., 1972, Histological and histochemical effects of microwave radiation on the central nervous system of rabbits and guinea pigs, Am J Physiol Med 51:182-190.
Bawin, S.M., Gavalas-Medici, R.J., and Adey, W.R., 1973, Effects of modulated very high frequency fields on specific brain rhythms in cats, Brain Res 58:365-384.
Carroll, D.R., Levinson, D.M., Justesen, D.R., and Clarke, R.L., 1980, Failure of rats to escape from a potenially lethal microwave field, Bioelectromagnetics 1:101-115.
Chizhenkova, R.A., 1988, Slow potentials and spike unit activity of the cerebral cortex of rabbits exposed to microwaves, Bioelectromagnetics 9:337-345.
Chou, C.K., Guy, A.W., and Galambos, R., 1982a, Auditory perception of radiofrequency electromagnetic fields, J Acoust Soc Am 71:1321-1334.
Chou, C.K., Guy, A.W., McDougall, J.B., and Han, L.F., 1982b, Effects of continuous and pulsed chronic microwave exposure on rabbits, Radio Sci 17:185-193.
Czerski, P., Ostrowski, K., Shore, M.L., Silverman, C.H., Sues, M.J., and Waldeskog, B., eds., 1974, "Biological Effects and Health Hazard of Microwave Radiation: Proceedings of an International Symposium," Polish Medical Publisher, Warsaw.
D'Andrea, J.A., Gandhi, O.P., and Kesner, R.P., 1976, Behavioral effects of resonant electromagnetic power absorption in rats. In: "Biological Effects of Electromagnetic Waves," vol 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
D'Andrea, J.A., Gandhi, O.P., and Lords J.L., 1977, Behavioral and thermal effects of microwave radiation at resonant and nonresonant wavelengths, Radio Sci 12:251-256.
D'Andrea, J.A., Gandhi, O.P., Lords, J.L., Durney, C.H., Johnson, C.C., and Astle, L., 1979, Physiological and behavioral effects of chronic exposure to 2450-MHz microwaves, J Microwave Power 14:351-362.
D'Andrea, J.A., Gandhi, O.P., Lords. J.L., Durney, C.H., Astle, L., Stensaas, L.J., and Schoenberg, A.A., 1980, Physiological and behavioral effects of prolonged exposure to 915 MHz microwaves, J Microwave Power 15(2):123-135.
D'Andrea, J.A., DeWitt, J.R., Emmerson, R.Y., Bailey, C., Stensaas, S., and Gandhi, O. P., 1986a, Intermittent exposure of rat to 2450-MHz microwaves at 2.5 mW/cm2: behavioral and physiological effects, Bioelectromagnetics 7:315-328.
D'Andrea, J.A., DeWitt, J.R., Gandhi, O. P., Stensaas, S., Lords, J.L., and Nielson, H.C., 1986b, Behavioral and physiological effects of chronic 2450-MHz microwave irradiation of the rat at 0.5 mW/cm2, Bioelectromagnetics 7:45-56.
D'Andrea, J.A., Cobb, B.L., and de Lorge, J., 1989, Lack of behavioral effects in the rhesus monkey to high peak power microwave pulses at 1.3 GHz, Bioelectromagnetics 10:65-76.
de Lorge, J.O. , 1984, Operant behavior and colonic temperature of Macaca mulatta exposed

to radiofrequency fields at and above resonant frequencies. Bioelectromagnetics 5:233-246.
de Lorge, J., and Ezell, C.S., 1980, Observing-responses of rats exposed to 1.28- and 5.62-
GHz microwaves, Bioelectromagnetics 1:183-198.
DeWitt, J.R., D'Andrea, J.A., Emmerson, R.Y., and Gandhi, O.P., 1987, Behavioral effects of chronic exposure to 0.5 mW/cm2 of 2450-MHz microwaves. Bioelectromagnetics 8:149-157.
Dumansky, J.D., and Shandala, M.G., 1974, The biologic action and hygienic significance of
electromagnetic fields of super high and ultra high frequencies in densely populated areas.
In: "Biologic Effects and Health Hazard of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Frey, A.H., 1977, Behavioral effects of electromagnetic energy. In: "Symposium on Biological Effects and Measurement of Radio Frequency Microwaves," D.J. Hazzard, ed., HEW Publication (FDA), 77-8026, Rockville, MD.
Frey, A.H., and Feld, S.R., 1975, Avoidance by rats of illumination with low power nonionizing electromagnetic energy, J Comp Physiol Psychol 89:183-188.
Frey, A.H., Feld, S.R., and Frey, B., 1975, Neural function and behavior: defining the relationship. Ann N Y Acad Sci 247:433-439.
Gage, M.I., 1979, Behavior in rats after exposure to various power densities of 2450 MHz
microwaves, Neurobehav Toxicol 1:137-143.
Goldstein, L., and Sisko, Z., 1974, A quantitative electroencephalographic study of the acute
effect of X-band microwaves in rabbits. In: "Biological Effects and Health Hazards of Microwave Radiation: Proceedings of an International Symposium," P. Czerski, et al., eds., Polish Medical Publishers, Warsaw.
Hjeresen, D.L., Doctor, S.R., and Sheldon, R.L., 1979, Shuttlebox-side preference as mediated by pulsed microwaves and conventional auditory cue. In: "Electromagnetic Fields in Biological System," S.S.Stuchly, ed., Ottawa,Canada.
Hunt, E.L., King, N.W., and Phillips, R.D., 1975, Behavioral effects of pulsed microwave radiation, Ann NY Acad Sci 247:440-453.
Johnson, R.B., Spackman, D., Crowley, J., Thompson, D., Chou, C.K., Kunz, L.L., and Guy,
A.W., 1983, Effects of long-term low-level radiofrequency radiation exposure on rats, vol.
4, Open field behavior and corticosterone, USAF SAM-TR83-42, Report of USAF School
of Aerospace Medicine, Brooks AFB, San Antonio, TX.
King, N.W., Justesen, D.R., and Clarke, R.L., 1971, Behavioral sensitivity to microwave irradiation, Science 172:398-401.
Krylova, I.N., Dukhanin, A.S., Il'in, A.B., Kuznetsova, E.Iu., Balaeva, N.V., Shimanovskii, N.L., Pal'tsev, Iu.P., and Iasnetsov, V.V., 1992, The effect of ultrahigh frequency electromagnetic radiation on learning and memory processes (article in Russian), Biull Eksp Biol Med 114:483-484.
Krylov, I.N., Iasnetsov, V.V., Dukhanin, A.S., and Pal'tsev, Iu.P., 1993, Pharmacologic correction of learning and memory disorders induced by exposure to high-frequency electromagnetic radiation (article in Russian), Biull Eksp Biol Med 115:260-262.
Kunjilwar, K.K., and Behari, J., 1993, Effect of amplitude-modulated radio frequency radiation on cholinergic system of developing rats, Brain Res 601:321-324.
Lai, H., Horita, A., Chou, C.K., and Guy, A.W., 1987, Low-level microwave irradiation affects central cholinergic activity in the rat, J Neurochem 48:40-45.

Lai, H., Carino, M.A., and Guy, A.W., 1989, Low-level microwave irradiation and central cholinergic systems, Pharmac Biochem Behav 33:131-138.
Lai, H., Carino, M.A., Horita, A. and Guy, A.W., 1990, Corticotropin-releasing factor antagonist blocks microwave-induced changes in central cholinergic activity in the rat, Brain Res Bull 25:609-612.
Lai, H., Carino, M.A., Horita, A. and Guy, A.W., 1992, Opioid receptor subtypes that mediate a microwave-induced decrease in central cholinergic activity in the rat. Bioelectromagnetics 13:237-246.
Lai, H., Horita, A., and Guy, A.W., 1994, Microwave irradiation affects radial-arm maze performance in the rat, Bioelectromagnetics 15:95-104.
Lebovitz, R.M., 1980, Behavioral changes during long-term microwave irradiation. In: "Proceeding of the International Symposium on the Biological Effects of Electromagnetic waves," UNSI, CNFRS, Jouy-en-Josas, France.
Levinson, D.M., Grove, A.M., Clarke, L.R., and Justesen, D.R., 1982, Photic cueing of escape by rats from an intense microwave field, Bioelectromagnetics 3:105-116.
Lin, J.C., 1978, “Microwave Auditory Effects and Applications”, Charles C, Thomas, Springfield, IL.
Lovely, R.H., Myers, D.E., and Guy, A.W., 1977, Irradiation of rats by 918-MHz microwaves at 2.5 mW/cm2: delineating the dose-response relationship, Radio Sci 12(6):139-146.
Mickley, G.A. and Cobb, B.L., 1998, Thermal tolerance reduces hyperthermia-induced disruption of working memory: a role for endogenous opiates? Physiol Beh 63:855-865.
Mitchell, C.L., McRee, D.J., Peterson, N.J., and Tilson, H.A., 1988, Some behavioral effects
of short-term exposure of rats to 2.45-GHz microwave radiation, Bioelectromagnetics 9:259-268.
Mitchell, D.S., Switzer, W.G., and Bronaugh, E.L., 1977, Hyperactivity and disruption of operant behavior in rats after multiple exposure to microwave radiation, Radio Sci 12(6):263-271.
Moe, K.E., Lovely, R.H., Meyers D.E., and Guy, A.W., 1976, Physiological and behavioral effects of chronic low-level microwave radiation in rats. In: "Biological Effects of Electromagnetic Waves," vol. 1, C.C. Johnson and M.L. Shore, eds., HEW Publication (FDA) 77-8010, Rockville, MD.
Monahan, J.C., and Henton, W., 1977, Free operant avoidance and escape from microwave radiation. In: “Symposium on Biological Effects and Measurement of Radio Frequency Microwaves”, D.J. Hazzard, ed, HEW Publication (FDA) 77-8026, Rockville, MD.
Navakatikian, M.A., and Tomashevskaya, L.A., 1994, Phasic behavioral and endocrine effects of microwaves of nonthermal intensity. In: “Biological Effects of Electric and Magnetic Fields, vol. 1”, D.O. Carpenter, ed., Academic Press, San Diego, CA.
Oscar, K.J., and Hawkins, T.D., 1977, Microwave alteration of the blood-brain barrier system of rats, Brain Res 126:281-293.
Ray, S., and Behari, J., 1990, Physiological changes in rats after exposure to low levels of microwaves. Rad Res 123:199-202.
Roberti, B., Heebels, G.H., Hendricx, J.C.M., deGreef, A.H.A.M., and Wolthuis, O.L., 1975, Preliminary investigation of the effect of low-level microwave radiation on spontaneous motor activity in rats, Ann NY Acad Sci 247:417-424.
Rudnev, M., Bokina, A., Eksler, N., and Navakatikyan, M., 1978, The use of evoked potential and behavioral measures in the assessment of environmental insult. In: "Multidisciplinary Perspectives in Event-Related Brain Potential Research," D.A. Otto, ed., EPA-600/9-77-043, U.S. Environmental Protection Agency, Research Triangle Park, NC.
Schrot, J., Thomas, J.R., and Banvard, R.A., 1980, Modification of the repeated

acquisition of response sequences in rats by low-level microwave exposure, Bioelectromagnetics 1:89-99.
Schwan, H.P., 1971, Interaction of microwave and radiofrequency radiation with biological systems, IEEE Microwave Th Tech MTT-19:146-150.
Sienkiewicz, Z., 1999, Behavioural effects of radiofrequency fields. In "Mobile Telephones and Health: an Update on the Latest Research", Gothenburg, Sweden.
Takashima, S., Onaral, B., and Schwan, H.P., 1979, Effects of modulated RF energy on the EEG of mammalian brain, Rad Environ Biophys 16:15-27.
Thomas, J.R., Finch, E.D., Fulk, D.W., and Burch, L.S., 1975, Effects of low level microwave radiation on behavioral baselines, Ann NY Acad Sci 247:425-432.
Wang, B.M. and Lai, H., 2000, Acute exposure to pulsed 2450-MHz microwaves affects water-maze performance of rats, Bioelectromagnetics 21:52-56