



EDIT-4

DREAM INSTITUTE OF TECHNOLOGY

Special points of interest:

- * ARTICLES BY FACULTY
- * ARTICLES BY STUDENTS
- * IMAGE GALLERY
- * ABOUT US
- * CAMPUS DETAILS
- * COLLEGE DETAILS



INSIDE THIS ISSUE:-

GLOBAL DIMMING	1,2,3
EFFECT UPON HU-	1,4,5
IMAGE GALLERY	7
ABOUT US	8
COLLEGE DETAILS	8
CAMPUS DETAILS	8

◆ GLOBAL DIMMING

Abstract: Tiny particles that are released when fuels are burned cause global dimming. Like global warming, this process may change rainfall patterns around the world.



The amount of sunlight reaching the Earth's surface has decreased by about 2 per cent every ten years, because more sunlight is being reflected back into space. The particles from burning fuels reflect sunlight, and they also cause more water droplets to form in the clouds. This makes the clouds better at reflecting sunlight back into space.

It is likely that global dimming has hidden some of the effects of global warming, by stopping some of the Sun's energy reaching the Earth's surface in the first place. Governments around the world are introducing controls on pollution. There is the possibility that as the air becomes less polluted by smoke and soot, global dimming will decrease, causing the effects of global warming to become more obvious.

⇒ **CONTINUED TO PAGE 2**

◆ EFFECT OF MICROWAVE BY MOBILE PHONE UPON HUMAN BEINGS

During recent years, the use of mobile phones has increased substantially and has been paralleled by growing concern about the effects on health attributed to exposure to the electromagnetic fields produced by them and their base stations. Demonstrating that radiation causes adverse effects on health would signal a widespread public health problem.

Mobile phones have been in extensive use for a relatively short period of time, and their technology has progressively changed, from analogue to digital systems. Mobile phones and base stations emit radio frequency or microwave radiation. Exposure to such a radiation could affect health directly. The use of mobile phones also results in indirect effects, such as car accidents and interference with health equipment.



⇒ **CONTINUED TO PAGE 4**

◆ CONTINUED-GLOBAL DIMMING

We are all seeing rather less of the Sun. Scientists looking at five decades of sunlight measurements have reached the disturbing conclusion that the amount of solar energy reaching the Earth's surface has been gradually falling. Paradoxically, the decline in sunlight may mean that global warming is a far greater threat to society than previously thought.

The effect was first spotted by Gerry Stanhill, an English scientist working in Israel. Comparing Israeli sunlight records from the 1950s with current ones, Stanhill was astonished to find a large fall in solar radiation. "There was a staggering 22% drop in the sunlight, and that really amazed me," he says.



Intrigued, he searched out records from all around the world, and found the same story almost everywhere he looked, with sunlight falling by 10% over the USA, nearly 30% in parts of the former Soviet Union, and even by 16% in parts of the British Isles. Although the effect varied greatly from place to place, overall the decline amounted to 1-2% globally per decade between the 1950s and the 1990s.

Gerry called the phenomenon global dimming, but his research, published in 2001, met with a skeptical response from other scientists. It was only recently, when his conclusions were confirmed by Australian scientists using a completely different method to estimate solar radiation, that climate scientists at

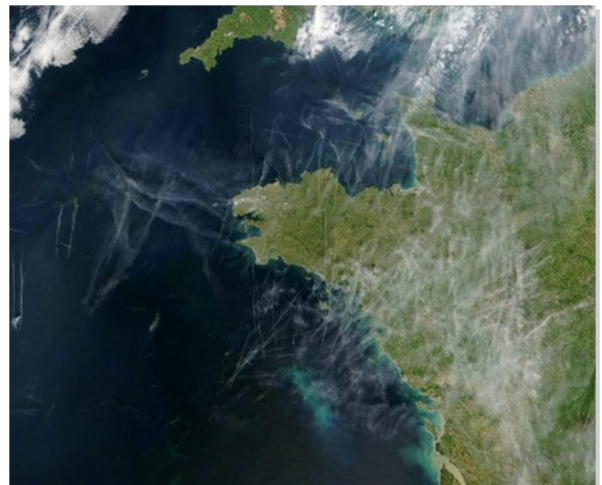
last woke up to the reality of global dimming.

Dimming appears to be caused by air pollution. Burning coal, oil and wood, whether in cars, power stations or cooking fires, produces not only invisible carbon dioxide (the principal greenhouse gas responsible for global warming) but also tiny airborne particles of soot, ash, sulphur compounds and other pollutants.

This visible air pollution reflects sunlight back into space, preventing it reaching the surface. But the pollution also changes the optical properties of clouds. Because the particles seed the formation of water droplets, polluted clouds contain a larger number of droplets than unpolluted clouds. Recent research shows that this makes them more reflective than they would otherwise be, again reflecting the Sun's rays back into space.

Scientists are now worried that dimming, by shielding the oceans from the full power of the Sun, may be disrupting the pattern of the world's rainfall. There are suggestions that dimming was behind the droughts in sub-Saharan Africa which claimed hundreds of thousands of lives in the 1970s and 1980s. There are disturbing hints the same thing may be happening today in Asia, home to half the world's population. "My main concern is global dimming is also having a detrimental impact on the Asian monsoon," says Prof Veerabhadran Ramanathan, one of the world's leading climate scientists. "We are talking about billions of people."

But perhaps the most alarming aspect of global dimming is that it may have led scientists to underestimate the true power of the greenhouse effect. They know how much extra energy is being trapped in the Earth's atmosphere by the extra carbon dioxide (CO₂) we have placed there. What has been surprising is that this extra energy has so far resulted in a temperature rise of just 0.6°C.



This has led many scientists to conclude that the present-day climate is less sensitive to the effects of carbon dioxide than it was, say, during the ice age, when a similar rise in CO₂ led to a temperature rise of 6° C. But it now appears the warming from greenhouse gases has been offset by a strong cooling effect from dimming - in effect two of our pollutants have been cancelling each other out. This means that the climate may in fact be more sensitive to the greenhouse effect than thought.

If so, then this is bad news, according to Dr Peter Cox, one of the world's leading climate modelers. As things stand, CO₂ levels are projected to rise strongly over coming decades, whereas there are encouraging signs that particle pollution is at last being brought under control. "We're going to be in a situation, unless we act, where the cooling pollutant is dropping off while the warming pollutant is going up. That means we'll get reduced cooling and increased heating at the same time and that's a problem for us," says Cox.



Even the most pessimistic forecasts of global warming may now have to be drastically revised upwards. That means a temperature rise of 10°C by 2100 could be on the cards, giving the UK a climate like that of North Africa, and rendering many parts of the world uninhabitable. That is unless we act urgently to curb our emissions of greenhouse gases.

Against all odds, it appears that there are also some advantages of Global Dimming. Air pollution may be helping the fight against global warming by enhancing the ability of plants to absorb carbon dioxide, scientists say.

Since the 1960s, increased levels of atmospheric pollution have enhanced plant productivity by as much as one quarter, research has found.

In terms of carbon dioxide, this means that an extra 10% has been stored in the soil.

The research was published in the scientific journal, Nature. It is a common assumption that plants grow best in clear sunny weather, but scientists say this is not always the case.

Research has shown that forests and crops can also thrive in hazy conditions because clouds and particles in the atmosphere scatter sun light so that it bathes more leaves.

That enhances photosynthesis, the process by which plants turn light and carbon dioxide into food.

Researchers have now analyzed the impact on plants of the dimmer, hazier skies that have resulted from increases in air pollution around the world since the 1960s.

They have calculated that this so-called "global dimming" is responsible for increasing plant productivity by as much as one quarter from 1960 to 1999.

Dr Lina Mercado from the UK's Centre for Ecology and Hydrology, the lead author of the study, said:

"This resulted in a net 10% increase in the amount of carbon stored by the land once other effects were taken into account," she was quoted as saying by the Press Association.

This study highlights some of the complications that arise when we try to tackle global warming.

As the world attempts to reduce the amount of smog and particulates in the atmosphere to improve human health, it will require even greater efforts to cut back on carbon dioxide.

This new research shows that plants will simply not absorb as much carbon dioxide in cleaner air conditions.

The research will also add weight to arguments about geo-engineering, the idea of curbing global warming by adding reflective materials to the atmosphere.

US President Barack Obama's chief scientific adviser, Professor John Holdren, recently told reporters that such ideas, once dismissed as half-baked, would have to be seriously discussed, such was the scale of the climate challenge.

Friday, April 02, 2010.

Dr. A. CHATTOPADHYAY
(Dean of Faculty)

◆ CONTINUED-EFFECT OF MICROWAVE BY MOBILE PHONE UPON HUMAN BEINGS

Experimental research on the effects of radio-frequency radiation is very broad and heterogeneous. It includes both studies of cell cultures and tissues (*in vitro*) and of laboratory animals (*in vivo*), as well as of people (volunteers). On one hand, these studies focus on functional changes in the brain and the resulting effects on cognition, and (to some extent) well-being – that is, the influence of exposure to radiation on the head. On the other hand, these studies focus on the possibility of a relationship between mobile phone use and carcinogenic processes, reproduction and development, the cardiovascular system and longevity – that is, exposure of the whole body. These studies found very small and reversible biological and physiological effects that do not necessary lead to diseases or injuries.

In the earlier days, cellular phones were of brick size and they were usually attached to immobile surfaces such as cars etc. However, developments in technology, have led to the introduction of many pocket sized mobile phones. The mobile phone depends upon the use of radiations for its function. Since the whole world has been lured by this necessity, there is always a concern about the following harmful effects of the radiations: -

Thermal effects

One well-understood effect of microwave radiation is dielectric heating, in which any dielectric material (such as living tissue) is heated by rotations of polar molecules induced by the electromagnetic field. In the case of a person using a cell phone, most of the heating effect will occur at the surface of the head, causing its temperature to increase by a fraction of a degree. The brain's blood circulation is capable of disposing of excess heat by increasing local blood flow. However, the cornea of the eye does not have this temperature regulation mechanism and exposure of 2–3 hours' duration has been reported to produce cataracts in rabbits' eyes

Non-thermal effects

The communications protocols used by mobile phones often result in low-frequency pulsing of the carrier signal. Whether these modulations have biological significance has been subject to debate. There are several thermo receptor molecules in cells, and that they activate a cascade of second and third messenger systems, gene expression mechanisms and production of heat shock proteins in order to defend the cell against metabolic **cell stress** caused by heat. The increases in temperature that cause these changes are too small to be detected by studies such as REFLEX, which base their whole argument on the apparent stability of thermal equilibrium in their cell cultures.

Blood-brain barrier effects

Microwave causes a leakage of albumin into the brain via a permeated blood-brain barrier.

A large Danish study about the connection between mobile phone use and cancer incidence was published. It followed over 420,000 Danish citizens for 20 years and showed no increased risk of cancer

In order to investigate the risk of cancer the following studies of long time exposure have been published:

- (1) Cell phone users had an increased risk of malignant gliomas.
- (2) Link between cell phone use and a higher rate of acoustic neuromas.
- (3) Tumors are more likely to occur on the side of the head that the cell handset is used.
- (4) One hour of cell phone use per day significantly increases tumor risk after

ten years or more.

(5) calcium ion efflux from brain tissue is extremely sensitive to irradiation with radiofrequency waves. "At 15 MHz and various exposure levels showed that "The effect at 0.0007 mW/g SAR [specific absorption rate] was quadruple the effect at 2.0 mW/g, **in other words 3000 times the intensity had 4 times less of an effect under these particular conditions.**" Looking at it the other way, **an intensity three thousand times lower had an effect four times greater.**

(6) **white blood cell phagocytosis was stimulated by chronic exposure to the lowest intensities of radio waves and inhibited, sometimes severely, by higher intensities.** . . . Exposure levels ranged from 0–4 mW/cm² to 120 mW/cm².

(7) In another study on blood, "These results were further refined by a 30-day experiment with guinea pigs at 1, 5, 10, and 50 mW/cm². All these intensities increased complement in the blood and stimulated phagocytosis by neutrophils, but **1 mW/cm² had the biggest effect, and 50 mW/cm² the smallest effect.**"



Electromagnetic hypersensitivity

Some users of mobile handsets have reported feeling several unspecific symptoms during and after its use; ranging from burning and tingling sensations in the skin of the head and extremities, fatigue, sleep disturbances, dizziness, loss of mental attention, reaction times and memory retentiveness, headaches, malaise, tachycardia (heart palpitations), to disturbances of the digestive system. Reports have noted that all of these symptoms can also be attributed to stress and that current research cannot separate the symptoms from placebo effects

Genotoxic effects

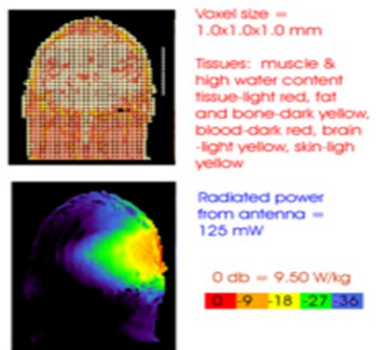
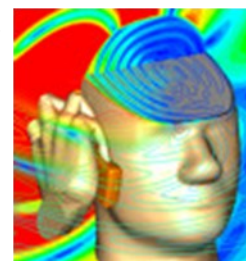


Figure 5a. Geometry of (top) and SAR distribution in phantom human head model exposed to 1900 MHz dipole antenna.

W/kg showed a correlation between increasing SAR and decreased motility and vitality in sperm, increased oxidative stress and 8-Oxo-2'-deoxyguanosine markers, stimulating DNA base adduct formation and increased DNA fragmentation.

A large recent meta-study of 101 scientific publications on genotoxicity of RF electromagnetic fields shows that 49 report a genotoxic effect and 42 do not. Research published in 2004 by a team at the [University of Athens](#) had a reduction in reproductive capacity in fruit flies exposed to 6 minutes of 900 MHz pulsed radiation for five days. Subsequent research, again conducted on fruit flies, was published in 2007, with the same exposure pattern but conducted at both 900 MHz and 1800 MHz, and had similar changes in reproductive capacity with no significant difference between the two frequencies. Following additional tests published in a third article, the authors stated they thought their research suggested the changes were "...due to degeneration of large numbers of egg chambers after DNA fragmentation of their constituent cells ...". Australian research conducted in 2009 by subjecting *in vitro* samples of human spermatozoa to radio-frequency radiation at 1.8 GHz and specific absorption rates (SAR) of 0.4 to 27.5



ONE INTERESTING & GREAT EXAMPLE OF EXPOSURE OF MICROWAVE UPON RAT:

Figure 1. Scheme of radiation mimicking mobile phone by horn antenna to rats in plastic chamber. Rats were loaded into plastic cage, confined by the chamber's wall, and received systematic microwave exposure rostrocaudally as illustrated in the figure.

Progress In Electromagnetics Research, PIER 82, 2008 291

microwave exposure rostrocaudally. Their movements were confined by the wall of the cage and their heads were 5 cm away from the irradiation bomb. Microwave exposure was given twice a day (2 h in the morning and 2 h in the afternoon), for 21 consecutive days. The control animals were treated similarly except for the exposure to microwave.

Detection of Apoptosis

Rats were sacrificed under deep anesthesia and their brains were collected and fixed in 4% paraformaldehyde for 6 h. Paraffin-embedded rat brain sections were prepared according to routine procedures. Slides were stained with terminal deoxynucleotidyl transferase-mediated dUTP nick-end labeling (TUNEL) assay and Streptavidin peroxidase (SP) immunohistochemistry assay to determine the apoptotic state of brain neuronal cells as well as their expression level of Bcl-2 and Bax. Cells showed buffy or brownish red granules in their cytoplasm were regarded as positive. Labeling Index (LI) was calculated according to the following formula: $LI = (\text{positive cell number} / \text{total cell count}) \times 100\%$.

Statistics

Data were presented as mean \pm SD and statistical analyses were evaluated by Two-Way ANOVA (SPSS 10.0 software). P value < 0.05 is considered as statistically significant.

RESULTS

After exposure to microwave, the cultured cortical neuronal cells were allowed to continue growth for 48 h before trypan blue staining. We found no significant difference between 0.025 mW/cm² power density group and control group in the percentage of dead cell after microwave exposure. However, the percentage of dead cell reached $11.70 \pm 2.67\%$ when the cells were exposed at 0.05 mW/cm² power density for 12 h, which is much higher than that of the control group.

Similarly, exposure at 0.1 mW/cm² power density for 8 h also leads to significantly higher cell death rate ($14.62 \pm 2.43\%$) than that of the control group. Moreover, in both 0.05 mW/cm² and 0.1 mW/cm² power density groups, more cell died as the exposure time prolonged (Fig. 2).

Figure 2. The effects of microwave emitted from mobile phones on the survival of *in vitro* cultured rat cortical neuronal cells ($n = 12$). Microwave exposure at 0.05mW/cm² power density for 12 h, or 0.1mW/cm² power density for 8 h led to significant cell death, and more cell died as the exposure time prolonged. The mortality of neuronal cells was determined by typan blue staining. group and pure operation group and was highest in radiation plus operation group.

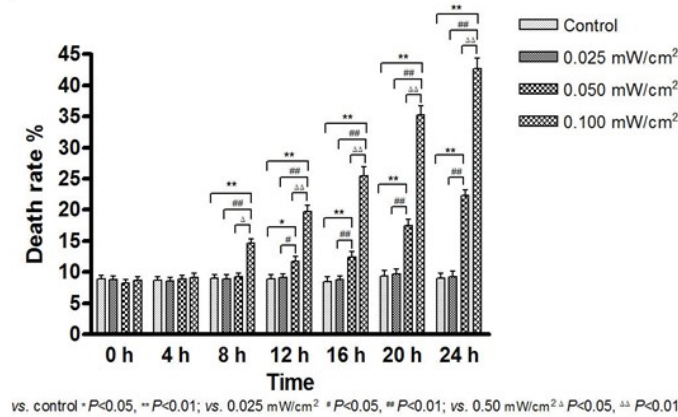


FIG2

DISCUSSION

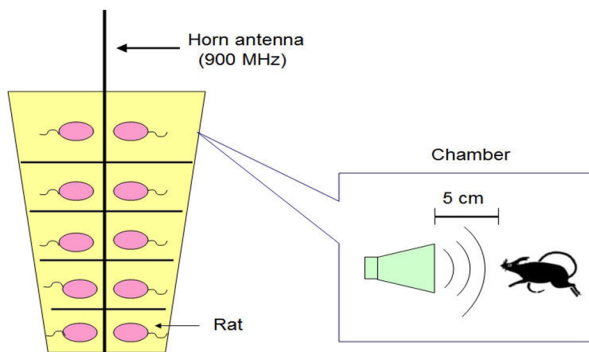
Microwaves from mobile phones induced neuronal death both *in vivo* and *in vitro*

In this present work, we used the neonatal rat cortical neuronal culture as an *in vitro* model to explore the potential CNS injury **Progress In Electromagnetics Research, PIER 82, 2008 293**

In vivo neuronal cell death in the form of apoptosis after microwave exposure Apoptosis is characterized with DNA fragmentation. TUNEL method [28] was developed for detecting *in situ* apoptosis at the single-cell level, while preserving tissue architecture. Conventional histological sections, pretreated with protease, were nick end labeled with biotinylated poly dU, introduced by terminal deoxy-transferase, and then stained using avidin-conjugated peroxidase. The reaction is specific, only nuclei located at positions where apoptosis is expected are stained. Our experiments using TUNEL assay showed microwave exposure, though induced significant neuronal apoptosis in the radiation plus operation group (rats with cranial defect), led to little neuronal cell apoptosis in the pure radiation group (rat with intact cranium). Because cell apoptosis is an early marker for cell injury and necrosis, our results indicate intact cranium seems to be **294 Zhu et al.** important in protecting the CNS against microwave injury.

CONCLUSIONS

Although the specific mechanism mediating the microwave induced neuronal apoptosis is still uncertain, our present study not only showed that the *in vitro* cultured cortical neuronal cells and *in vivo* CNS with cranial defect were susceptible to apoptotic injury by mobile phone microwave, but also indicated that factors beside Bax and Bcl-2 were involved in the regulation of this apoptosis process. We believe future efforts made to explore the basic mechanism underlying the mobile phone microwave induced CNS injuries would be especially important for patients who have cranial defects as a result of traumatic brain injury or brain tumor. As the subject by itself is controversial, the cell phones can be utilized judiciously and purposefully not profound use, as



prevention is always better than cure.

RINKI SHA
3RD YEAR ECE



IMAGE GALLERY



◆ COLLEGE CAMPUS



◆ LABORATORIES



◆ TRANCE'08

◆ ABOUT US

In today's society science and technology plays a very important part in every walk of life. Every day the role of technology in our lives are becoming more and more important and with this increases the need for engineers. So it is necessary to setup more and more engineering colleges. But the engineering college setup must have all the necessary provisions required for a student to get proper training in their respective branches. The college should not remain only as a profit making company; instead it should be a place to provide best possible facilities for the students and the best working atmosphere for the staff. So here we propose an institute of technology where all the students will get the best possible facilities in their respective fields.



◆ ABOUT DREAM

Establishment: 2006

Institution Type: Private College

Recognition: Approved by the All India Council for Technical Education (AICTE), New Delhi;

AICTE Region: Eastern

Here is list of courses offered by the institution:-

1. COMPUTER SCIENCE ENGINEERING(60 SEATS)
2. ELECTRONICS AND COMMUNICATION ENGINEERING(60 SEATS)
3. ELECTRICAL ENGINEERING(60 SEATS)
4. APPLIED ELECTRONIC ENGINEERING(60 SEATS)

◆ COLLEGE CAMPUS DETAILS

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◆ Dr. D. Sarkar (college director):

Mr. Dipankar Sarkar is a Doctorate in Electrical Engineering IIT (New Delhi) and also involved in the promotion of various colleges for the past 7 years.

- ⇒ **D**REAM
- ⇒ **R**ESearch
- ⇒ **E**DUcation
- ⇒ **A**DVANCEMENT
- ⇒ **M**OTIVATION

◆ For more details

www.dreaminstituteonline.org

◆ EDIT4 DESIGNED BY - **Saheli Das**
(ECE 3RD YEAR)