



# **EM Radiation is Harmful**

**Research - Findings - Solutions**

**A report on the effect of electro magnetic radiation  
in the environment on the human physiology  
and how to minimise its effect**

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# Lifeshields

## EM Radiation is Harmful

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## EM Radiation is Harmful

### Summary

All over the world electronic pollution is a new and dangerous form of environmental pollution. This pollution, which is invisible and cannot be felt, consists of electromagnetic radiation caused by domestic appliances, motor vehicles, aircraft, industrial machinery, mobile phones, computers, radio and television transmitters, base stations and just about all devices using electronic technology.

Living in today's world we are continually being exposed to this type of electromagnetic radiation. In addition, all metal objects such as electrical circuits and associated wiring, telephones, water and even gas pipes, as well as metal objects we carry on our person such as keys, watches, rings and many other types of jewellery act as antennae which can collect and radiate disorientating energy waves, and can actually change the natural polarities of the human body.

Most people today receive electromagnetic radiation up to 200 million times more intense than that which our ancestors received from the sun, stars and other natural sources. This can result in altered polarity in the human cells. Altered body polarity may cause physiological and psychological effects such as tension, frustration, apprehension, depression, headaches etc, can lower the body's resistance to bacterial and viral infections and produce other symptoms of disease. (Laboratory tests on animals have shown hormone, blood sugar, and enzyme changes).

So every-day activities such as using a mobile phone or computer, travelling in a car or aircraft can expose us to electromagnetic radiation that causes drowsiness, lack of concentration, impaired judgement, headaches, fatigue, dizziness, memory loss etc, which can have a serious impact on our ability to operate safely and efficiently. In severe cases it may result in brain damage.

The "electronic smog" in which we live affects all people by distorting their natural bio-energy fields, and the quest for a solution led to the development of a special device called the "Therapeutic Device" Microcrystal Resonator. This device creates a special relationship between the electromagnetic radiation fields and the user, so providing a "shield" from the radiation.

The "Therapeutic Device" ensures that a constant flow of positive energy is maintained to all parts of the human body. The microcrystal resonators have been engineered to protect the users of mobile phones, hand-held cordless phones, computer screens, travellers in car and aircraft, etc. from being entrained by the ever-increasing environmental electromagnetic fields caused by electronic devices.

Researched, designed and developed by Patrick A. Walsh, a Health Practitioner and Electrical/Mechanical Development Engineer, the Therapeutic Device is essentially a microcrystalline composition, sensitive to certain energy waves in the electromagnetic spectrum. It creates a protective force shield, removing the compository charge from electrons. (small particles of energy) so they will have no further effect on your bio physical fields (the human body).

Until recently it has been almost impossible to protect ourselves from the bombardment of electromagnetic radiation in our daily lives. Now, however, such protection is obtainable with the "Therapeutic Device" Microcrystal Resonator.

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## EM Radiation is Harmful

### The Problem

#### Electromagnetic Radiation is Harmful

From time immemorial man has existed within the Earth's magnetic fields. These fields are weak and non coherent. However in the last 100 years the amount of man made magnetic fields has dramatically increased. The problem with the man made fields is that it is not subtle, it is more coherent than that of the earth and does not blend into the life fields. The body cannot absorb or counter this type or profile of magnetic and electrical field and the rate of change is faster than the body can adapt to.

In today's world we have an environment where technology is predominant - mobile phones, computerised household devices, multiple computers in cars and aircraft etc. They all have at least one thing in common, they emit low frequency magnetic fields. These fields are difficult to measure, are unseen and affect the cells in humans, plant and animals. The effects are varied but unfortunately not beneficial. They are in fact detrimental to the well-being and health of most cells. The magnetic interference reduces our potential to perform and make decisions, and may well effect the unborn. Because it is hard to measure it is difficult to determine the exact extent to which it is cause of various illnesses. One area of science that has not progressed as much as it should have is that of measurements of electromagnetic fields at very low frequency and its interference with living cells. However there are a number of tools available and we should take the advantage of these rather than decrying them as not being fully proven, as they are in effect the best we have.

#### How do these fields impact mankind?

When the body is in balance the cells in the body have a natural resonance and all cellular communications are efficient. The cells are not "quiet". They in fact go through many rest - active - rest states in any one day. The cell's ability to change states efficiently is vital for a person to be at peak performance. The activity or change of states requires a compound called *adenosine triphosphate* (ATP) to be absorbed, allowing the  $K^+$  and  $Na^+$  chemicals to flow without disruption. The energy to change states and maintain healthy cells requires that ATP absorption is completed in order for this energy to be released. If no energy is released then the cells eventually migrate to entropy and cell death. The absorption is hindered or disrupted by ELF magnetic fields, these interfere with cellular communication and, most vitally, cell functions.

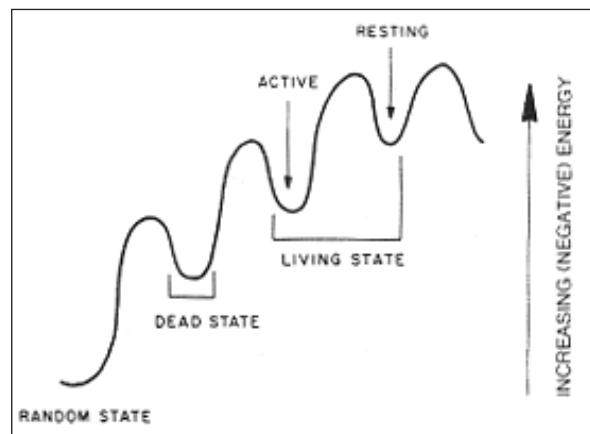
Each cell in the body has 4 major components - emotional, physical, mental and the overall composite. The influence of the ELF magnetic fields on the cell varies between humans, however the sum of the losses does not vary much between people. Tests conducted so far give this variance about 10%.

#### Physiology of the Living Cell

*Life at the Cell and Below-Cell level - Gilbert N. Ling*  
*Revolution in the Physiology of the Living Cell - Gilbert N. Ling*

Gilbert Ling has a thesis which is named AIH (Associated-Induction Hypothesis) a brief description follows.

"Having the correct components in the right proportion is a necessary but not a sufficient condition to produce a living cell. Each of the components must also occupy a specific position in relation to the other components. But even this is not sufficient to produce a living cell - a well-preserved dead cell may also satisfy this criteria.



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In AI hypothesis, this assembly of the right number and kind of atoms, molecules and ions, each occupying the right relative spatial location, must also exist in a discrete state - in the sense the word is used to indicate, say, the liquid or solid state - called the living state, with high (negative) energy and low entropy.”

In summary the state of a cell being alive does not mean continued functional activity of one sort or another. Rather, it means the cell exists in the specific discrete high (negative) energy, low entropy state called the living state. The other states, apart from the living state, are active (living) state and death and these represent discrete metastable equilibrium states of increasing high entropy and lower (negative) energy, tending toward the ultimate random state.

### ATP: The Perfect Energy Currency for the Cell

*Jerry Bergman, Ph.D.*

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A critically important macromolecule-arguably “second in importance only to DNA” - is ATP. ATP is a complex nanomachine that serves as the primary energy currency of the cell (Trefil, 1992, p.93). A nanomachine is a complex precision microscopic-sized machine that fits the standard definition of a machine. ATP is the “most widely distributed high-energy compound within the human body” (Ritter, 1996, p. 301). This ubiquitous molecule is “used to build complex molecules, contract muscles, generate electricity in nerves, and light fireflies. All fuel sources of Nature, all foodstuffs of living things, produce ATP, which in turn powers virtually every activity of the cell and organism. Imagine the metabolic confusion if this were not so: Each of the diverse foodstuffs would generate different energy currencies and each of the great variety of cellular functions would have to trade in its unique currency” (Kornberg, 1989, p. 62).

ATP is an abbreviation for adenosine triphosphate, a complex molecule that contains the nucleoside adenosine and a tail consisting of three phosphates. (See Figure 1 for a simple structural formula and a space filled model of ATP.) As far as is known, all organisms from the simplest bacteria to humans use ATP as their primary energy currency. The energy level it carries is just the right amount for most biological reactions. Nutrients contain energy in low-energy covalent bonds which are not very useful to do most of kinds of work in the cells.

These low energy bonds must be translated to high energy bonds, and this is a role of ATP. A steady supply of ATP is so critical that a poison which attacks any of the proteins used in ATP production kills the organism in minutes. Certain cyanide compounds, for example, are poisonous because they bind to the copper atom in cytochrome oxidase.

The limited tests conducted so far suggest a significant detrimental effect on the cells of the body (also in animals and plants). As an example cars show a increase of magnetic radiation 4 to 5 times that of cars manufactured 15 years ago, similar results have been tested in aircraft.

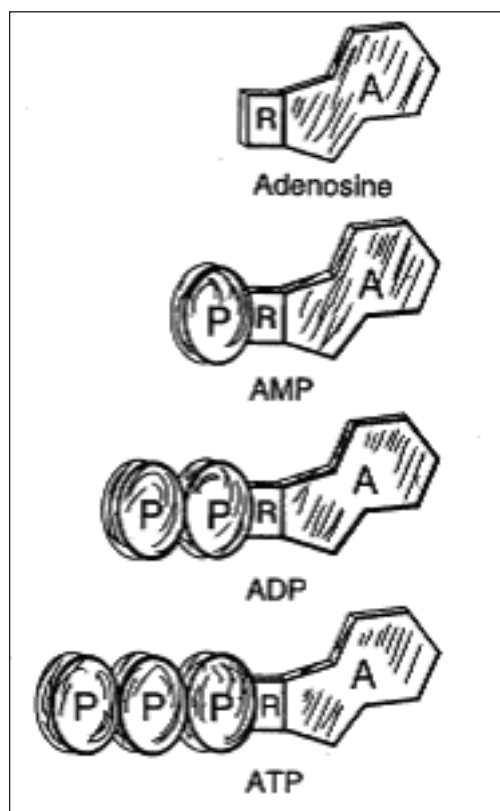


Fig. 1. Views of ATP and related structures.

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### Aircraft to Vehicles

The developed world has moved from drink driving being the major cause of road deaths to accidents caused by drivers falling asleep at the wheel. The risk of drowsiness and eventually sleep is increased as time passes the 2 hour mark in running motorbike/car/bus/lorry.

Aircraft do not escape the impact of computers and technology. The levels of low frequency magnetic radiation have increased by 4 fold from the days of the Boeing 747 and this may well be the reason for the level of air rage, pilot error and ill-effects after the passengers and crew have departed.

*Published 2005 Sponsored by Privilege Insurance*

Over a million drivers return from holidays overseas to suffer from "Driver Lag" - a condition similar to jet lag but which affects driver safety. Identified as a result of new research by Privilege Insurance, the condition could be contributing to over 60,000 driving incidents in the airport car park, or the immediate drive home from the airport alone as a result.

Driver Lag sufferers experience fatigue (26 per cent), disturbed sleep patterns (17 per cent) and a lack of energy (16 per cent), the Privilege study finds.

And it's not just in the airport car park or on the journey home where drivers are causing incidents. Motorists report problems with their driving ability in the week after returning from vacation. Sufferers report lost concentration behind the wheel (four per cent), unintentional speeding (four per cent) and stalling their vehicle (three per cent).

With the effects of Driver Lag lasting long after the drive home from the airport, five per cent said they were more irritable with other road users as a result, three per cent say their reaction times were slower, and four per cent avoided driving altogether in the week after their holiday.

Tiredness was identified by the Privilege research as a key contributor of Driver Lag with almost 39 per cent of those experiencing the condition claiming not to have slept well on the return flight. A small but significant three per cent of the sample admitted to drinking above the legal limit on their flight before driving.

Aviation Health expert, Farrol Kahn, who took part in the research, described the importance of the findings: "The study shows that air travel can exacerbate the tiredness of motorists and endanger road safety. It establishes a direct link between flying and road safety.

"The research has identified a new condition, Driver Lag, that can last up to a week post-flight. Driver Lag has all the similar symptoms to jetlag and can affect all motorists irrespective of age, from 18 years old to those over 50, although younger motorists appear to be more at risk.

"A surprising factor is that while the symptoms may be more intense for long-haul passengers, Driver Lag still affects short-haul passengers as well."

Ian Parker, Managing Director of Privilege Insurance, said:

"We know that many people experience negative physical symptoms and a change in their driving behaviour following a flight. Bearing in mind the number of people that drive to airports to catch holiday flights, we wanted to identify the impact of this on motorists.

"Our research shows that people may be putting themselves and their passengers at risk by getting straight into their cars after landing. We are advising drivers to heed this warning, take plenty of rest before driving home or consider alternative transport such as a lift from friends or family or public transport."

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## EM Radiation is Harmful

### Motor Vehicles

Research shows that driver fatigue can seriously effect a person's normal driving ability long before they actually fall asleep at the wheel of their vehicle.

Below are some findings from tests conducted during a 2.5 hour motorway drive:

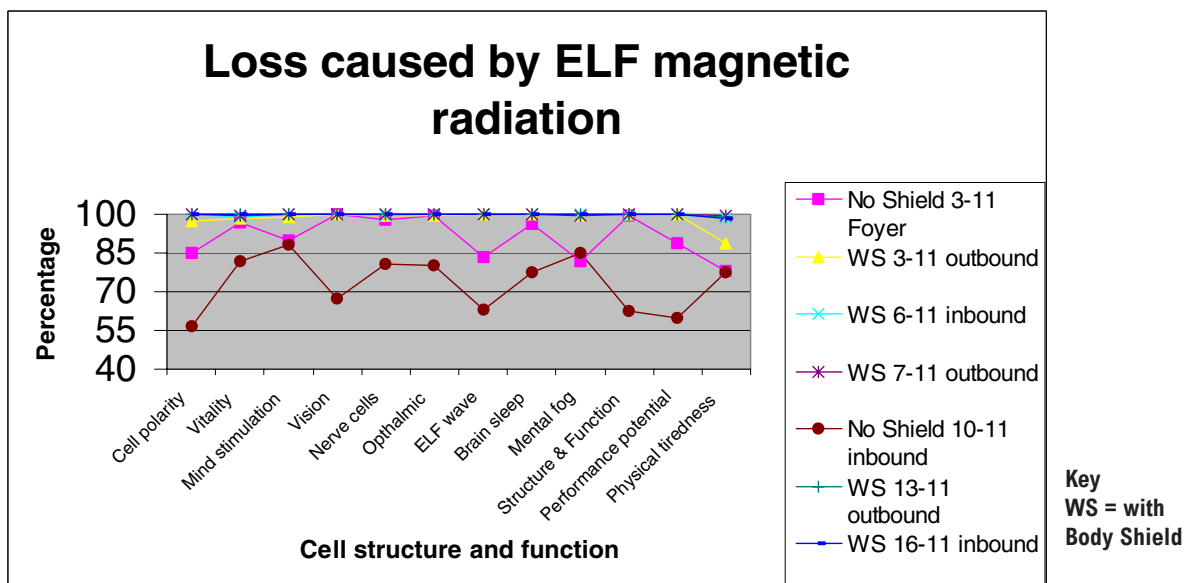
- **Brain balance** (sleep, tiredness, fatigue, coordination) - down by **42%**.
- **Vision** - down by **39%**.
- **Mental and emotional vitality** - down by **40%**.
- **Psychological** (temper, tenseness) - down by **41%**.
- **Performance** - down by **50%**.
- **Cellular** (cell vitality) - down by **36%**.
- **Body** reaction to radiation intusion - down by **42%**.

### Aircraft

The following chart show the results of tests conducted on a Captain flying a Boeing 747. The Flight segments were between Heathrow and San Fransisco.

The tests were concluded approximately 2 hours before take off and 1-1.5 hours after the landing. The aircraft in all cases was a Boeing 747.

Parameters tested: Ophthalmic, mental fog, performance potential, ELF wave, nerve cells, brain sleep centre, mind - mental stimulation, ELF influence, cell polarity, mental tiredness, physical tiredness



The tests showed that on average the decline was about **23%**. The most affected area were the nerve cells where the worst case was down by **36%**, and the Brain Sleep centre down by **42%**. This means that there is high tendency to fall asleep.

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## **EM Radiation is Harmful**

### **Mobile phones**

While this technology forms part of everyday life both at the home, social and business it too comes with some bad side effects. The real issue with the mobile phone is the amount of use and that it continues to damage the cells whilst in the pocket. The constant tracking and monitoring the transmitter is causing the continuous emission of magnetic interference.

### **DNA damage in brain cells blocked by anti-oxidants**

Other biological effects have emerged. In January 2004, Henry Lai and Narendra Singh of the Bioelectromagnetics Research Laboratory in the University of Washington in Seattle, USA, reported that exposing rats to weak 60 Hz magnetic fields caused DNA breaks in their brain cells and brain-cell death; and furthermore, the DNA damage can be blocked by antioxidants. This suggests that magnetic fields somehow caused the accumulation of oxidative free radicals, which damaged the DNA, leading to cell death.

### **U.S. Naval Medical Research Center**

ELF (extra low frequency) waves are many miles long and are the most sluggish of the frequency spectrum. Their range is below 1000 Hertz, the same range as the brain-wave patterns of all animals including humans. The body's cells and organs, like every other living thing on the planet, have their own electromagnetic fields. These fields interact with the earth's natural electromagnetic field. ELF's external pulsating waves alter the way calcium ions bind to cells, creating an array of chemical changes, altering health and mental abilities. The U.S. Naval Medical Research Center discovered that the potency of a naturally occurring chemical in the body can be increased by "harmonizing" with that chemical's frequency. HAARP could quite possibly re-route chemical reactions in our bodies and have detrimental effects on overall health.

# Lifeshields

## EM Radiation is Harmful

### Solution

#### Summary of how the Microcrystal Cell Works

The reaction of human cells to electromagnetic fields causes interference with cell energy and cell energy transfer mechanisms involved in regulating and co-ordinating the biological activities of the cells. And this happens not only at the cell level. The whole system can also be affected in one way or another. The nature of electromagnetic pollution can alter the polarity axis of the cell activity, which in turn interferes with important biological transitions, causing entropy and possible cell destruction. It is not only electromagnetic fields that change coherency at the cell level; high stress levels can affect the live human system cellular activities in much the same way.

#### Why the use of Microcrystal technology?

All the cells in the body are interconnected to one another via the connective tissues. In our high-tech world liquid crystals happen to be the new and efficient way of communication. Connective tissues are also crystalline and they provide the rapid intercommunication required for efficient and highly co-ordinated energy transitions that enable the human system to act coherently. Biochemist James Oschman, (see Oschman (1984) said "the live human cellular systems are mechanically and electrically interconnected to each other via the connective tissues". The human system relies on this intercommunication to maintain its energy flow capabilities.

#### The Purpose of the Microcrystal Device

The purpose of the Microcrystal Device is to maintain good energy flow and polarity balance of the body energy fields. Electromagnetic and geopathic sources can affect all human biological energy systems in some way or another, and the understanding of this led to the development of these special devices. They have been engineered to provide protection from the daily effects of electrical pollution and magnetic forces.

These devices are of microcrystalline composition, and are sensitive to certain energy waves in the electromagnetic spectrum. They create a protective polarity balance so that the electromagnetic pollution has no further effects on the biological activities of the human body. It is therefore beneficial to the live human system, and because of its protective qualities it reduces cell death by helping the body to maintain a high degree of energy flow and coherence.

#### Quantum field coherence.

Another reason for using specialised microcrystals is for their unique ability of quantum coherence on energy storage in the living system. Coherence has its association with time and over which transition complimentary phases is maintained. Microcrystal structures use the existence of quantum space-time structure and are therefore capable of working in harmony with the quantum space-time structure in the living system. This allows for efficient energy transfer processes to occur over a wide range of timescales. In real terms the live system is made up of quantum fields of coherent activities over all space-times within the live system. Incoherent energy time-scales, such as environmental pollution, interfere with the live human system. Each microcrystal cell's quantum coherency captures the uncertainty relationship of cell energy flow and its pollution phase. The device removes the interfering phase and returns the energy flow of constant intercommunication between each different biological rhythm that takes place in a healthy living organism. (Organisms are interrelating positions of coherent activities, which are actively maintained).

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### Product descriptions

The Bodyshield is a Polarity Protector. Helps to protect you from background electromagnetic radiation, and regain normal vitality by balancing out undue stress, you feel calmer and aids positive attitudes within stressful situations.

**Mobile Phone Shield Polarity Protector.** Designed to protect biological systems from the negative effects of electrical pollution and magnetic forces, which may alter the human cell energy and its polarity balance.

**Computer Shield.** Helps protect the body from electromagnetic pollution emitted by computer systems.

**HomeShield Filter Wave Device.** A general-purpose unit for removing electromagnetic interference waves (hotspots) that occur in homes, buildings and offices. Its purpose is to remove electromagnetic and geopathic interferences that are present in buildings. It manifests and maintains a healthy energy field, which works in harmony with the live human system.

**Driver Alert.** Is a resonant translator device. It essentially consists of a microcrystal cell. Engineered to govern all of the necessary frequency ranges to effectively deal with the electromagnetic pollution intrusion within a vehicle's local environment that can interfere with a person's driving abilities such as fatigue and sleepiness.

**Please note: Phon-Pulse** refers to the Research & Development name used in the materials development stages.

**Therapeutic Device** is the title used for the Grant of Patent.

# Lifeshields

## EM Radiation is Harmful

### Discussion - Therapeutic Device

**Proven, clearly described mode of action, documented with objective proof.**

*Further Notes on "The Therapeutic Device" Microcrystal Resonator*  
By Patrick. A. Walsh M.N.A.C.H.P MinstSMM

For the purpose of this paper I am referring to the use of Mobile Phone, hand held cordless Phones and Computer VDU Screens.

#### THE PROBLEM

##### Electronic Pollution

All over the world electronic pollution is a new and dangerous form of environmental pollution. This pollution, which is invisible and cannot be felt, consists of electromagnetic radiation caused by domestic appliances, motor vehicles, aircraft, industrial machinery, mobile phones, computers, radio and television transmitters, base stations and just about all devices using electronic technology.

Living in today's world we are continually being exposed to this type of electromagnetic radiation. In addition, all metal objects such as electrical circuits and associated wiring, telephones, water and even gas pipes, as well as metal objects we carry on our person such as keys, watches, rings and many other types of jewellery act as antennae which can collect and radiate disorientating energy waves, and can actually change the natural polarities of the human body.

Most people today receive electromagnetic radiation up to 200 million times more intense than that which our ancestors received from the sun, stars and other natural sources. This can result in altered polarity in the human cells. Altered body polarity may cause physiological and psychological effects such as tension, frustration, apprehension, depression, headaches etc, can lower the body's resistance to bacterial and viral infections and produce other symptoms of disease. (Laboratory tests on animals have shown hormone, blood sugar, and enzyme changes).

Microwaves spread this source of radiation in dangerous quantities, and can parallel the little lightning point as seen on military and civil radar screens. Exposure to these microwaves can lead to various afflictions such as headaches, dizziness, tiredness, memory loss and loss of concentration. In severe exposure to microwave radiation this can lead to certain forms of brain damage. These pollution sources disturb, change, or reverse the bio-plasmic polarities either temporarily or permanently under sustained conditions.

#### **A Solution to the Electromagnetic Pollution Problem Caused by Mobile Phones and Hand Held Cordless Phones.**

Since electronic smog affects all people by disorientating their natural bio-energy fields, the quest for a solution led to the development of a special device called the "Therapeutic Device" Microcrystal Resonator. These devices create a special relationship between the electromagnetic radiation fields and their effect on the physical balance and equilibrium of people using mobile phones, hand held cordless phones and computer screens.

The "Therapeutic Device" ensures that a constant flow of positive energy is maintained to all parts of the body. The Microcrystal Resonators have been engineered to protect the users of mobile phones, hand held cordless phones, computer screens etc. from being entrained by the ever-increasing environmental electromagnetic fields caused by electronic devices.

# **Lifeshields**

## **EM Radiation is Harmful**

### **A New Dimension In Mobile Phone and hand held Cordless Phones Electronic Smog Safety!**

Until recently it has been almost impossible to protect yourself from the bombardment of electromagnetic radiation. Now, however, such protection can be obtained using an entirely new device, the Therapeutic Device Bio Gravity Field Amplifier, which has been designed to afford protection from the daily effects of destructive electrical smog and magnetic forces, which may alter our sensitive polarity balance.

Researched, designed and developed by Patrick. A. Walsh, a health practitioner and electrical/mechanical development engineer, the Therapeutic Device is essentially a microcrystalline composition, sensitive to certain energy waves in the electromagnetic spectrum. It creates a protective force shield, removing the compository charge from electrons (small particles of energy) so they will have no further effect on bio physical fields (the human body).

### **The Purpose of the "Therapeutic Device"**

The purpose is to maintain polarity balance within the human body and to translate the negative force field of mobile phone and cordless phones. We cannot avoid using mobile phones and other similar electronic devices, but by using such instruments, we are continually being exposed to electronic radiation bombardment. But we can offset this by using the "Therapeutic Device" to protect ourselves. The device has been specially designed to afford protection from the daily effects of destructive electrical and magnetic forces, which may alter body polarity.

Altered body polarity may cause problems such as tension, frustration, depression, headaches, apprehension and pains etc. PhoneShield is a passive device in that it does not require a battery or any other electrical source for its operation. The "Therapeutic Device" uses the body's own energy fields, together with related mobile phone emissions for power and amplification to aid the protection of the body's force fields, which is known as the bio-gravity field of the human body.

### **Technical notes**

The Therapeutic Device is effectively a passive solid-state negative ion effect generator. The device is able to change the counter-clockwise spin of sub-atomic particles of positive ions to clockwise spin. It is the positive spin of these minute energy systems that make the negative ions beneficial. The polarity change in the spin makes it appear that the "Therapeutic Device" can actually change the effects of positive ions to those of negative ions. On the other hand, when subatomic particles start spinning counter-clockwise the positive ion effect is produced.

GSM signals are bio-active low intensity, pulsed microwave radiation which can exert subtle, non-thermal influences on the body because they are wave formations of certain frequencies and, as such, have other properties than just the intensity within the radiation field. These continue to have well defined frequencies, which are very close to the human systems oscillatory electrical, and biological activities.

These particular frequencies utilised in GSM technology must then be recognised as being "bio-active" and are associated with pulsing with the multi-frame repetition rate of 8.34Hz and the 2Hz. The human system's oscillatory activity at the cellular level reacts dramatically to these frequencies with effects on processes as fundamental as cell division and intercellular communication. The two extra low frequencies (ELF) at 8.34Hz and 2Hz correspond to those found in the human EEG system, specifically, in the ranges of the Alpha and Delta brain waves respectively.

It can be said, in the case of GSM hand-sets, that these two ELF's are reinforced by those unscreenable magnetic fields associated with the battery of the handset which is necessary in order to operate the microwave emissions with the required pulse characteristics. When a proprietary shielding like the "Therapeutic Device" protects a handset it creates a biocompatible situation between the handset and its recipient.

# **Lifeshields**

## **EM Radiation is Harmful**

### **Special Feature of all Therapeutic Device Microcrystal Resonators**

Create Automatic Conversion to Correct Polarity Balance.

- 1) The automatic conversion changes the negative spin (counter clockwise) to positive spin (clockwise) at the natural vortex centre of the live human system.
- 2) Therefore, the same feature will change the positive to negative spin at the natural vortex centre of the live human system.

### **Your personal protector from Electromagnetic Radiation Effects**

The Therapeutic Device and Computer-Device effectively change the negative effects caused by electromagnetic emissions, thereby helping to avoid the RADIATION DANGER ZONE.

These devices are constructed using a propriety formula of microcrystal composition, which attracts and transforms negative electromagnetic radiation fields making them biocompatible.

The Therapeutic Device and Computer-Device is not a blocking device; it transforms cellular related emissions of the radiation field into a positive means of protection to the user of electronic devices.

There are no harmful side effects.

**Lifeshields**  
**EM Radiation is Harmful**



# Certificate of Grant of Patent

Patent Number: GB2364602  
Proprietor(s): Patrick A Walsh  
Inventor(s): Patrick A Walsh

*This is to Certify that, in accordance with the Patents Act 1977,*

a Patent has been granted to the proprietor(s) for an invention entitled  
"Therapeutic device" disclosed in an application filed **21 May 2001**.

Dated 15 January 2003



**Alison Brimelow**  
*Comptroller General of Patents,  
Designs and Trade Marks*  
UNITED KINGDOM PATENT OFFICE

**The attention of the proprietor(s) is drawn to the important notes overleaf.**



## Lifeshields EM Radiation is Harmful

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radiation, but this is not so: the Consumers Association recently pointed out that such devices may actually increase radiation levels at the skull surface, and the industry (which officially still denies adverse health effects) only offers such kits as a means of 'phone conversation whilst driving a vehicle.

Regulatory authorities use the Specific Absorption Rate ("SAR") as their metric, though this may not be correct if non-thermal effects are taken into consideration. Most handsets comply with this metric, but are not far from the limit and on occasion can exceed the limit according to experts in the field.

In an attempt to solve this problem, a number of devices have emerged which claim to mitigate adverse effects of cellphone radiation. One such device is the 'PHON-PULSE' device invented by the present application and developed by Pulse Developments. The PHON-PULSE device comprises a casing with a metallic base portion which houses quartzite-schist crystals. The ability of such a crystal structure to influence bio-energy systems has been investigated by the Coghill Research Laboratories, Pontypool, Gwent by using an established cell model, the human peripheral blood lymphocyte. Samples of the lymphocyte were subjected to radiation from mobile 'phones, to some of which PHON-PULSE devices had been attached. Analysis showed not only that the mobile 'phones had an adverse affect on the number of viable cells in each sample (as compared to a control sample), but also that the number

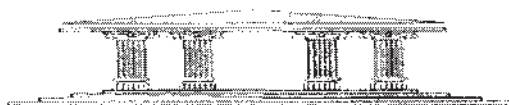
## Lifeshields

### EM Radiation is Harmful

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of non-viable cells was greatest in the samples exposed to radiation absent the PHON-PULSE device. Accordingly, the conclusion reached by the researches was that the study gave some indirect support to the claim that the PHON-PULSE device protects 5 against headaches and fatigue attributed to use of mobile 'phones.

## Lifeshields EM Radiation is Harmful



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16 April, 2002

Pulse Developments  
39 Langley Close  
Ramsey Road  
St Ives  
Huntingdon  
Cambs  
PE27 5SE

Dear Patrick

Thank you for your kind letter of 19 May 2000. I am happy to confirm that we have tested The Therapeutic Device (Patent Name) in our Laboratory for its effectiveness in protecting the viability of human peripheral blood lymphocytes and found a distinct protective effect compared with exposed but unprotected cells and controls from the same culture

Whilst further tests are needed, e.g. a double blind case control study with user subjects, (which we are willing to carry out in due course), our own initial tests support the claim that the device is effective as a means of mitigating the biological effects of cellphone handset radiations. Our study incidentally found adverse effects from exposure of lymphocytes to cellphone handsets without protection, and this confirms other studies (e.g. Lyle, Scheeter et al. 1983) which have reported similar adverse or lymphocytes from RF/MW radiation at lower than thermal levels of exposure. The Lyle group's study was at modulated RF frequencies. We shall be reporting these new experiments at 1.9 GHz frequencies at a forthcoming scientific conference.

As you know we have published a CD ROM "Masts and Mobiles: Is There A Health Risk?", and aim to make this the most complete compilation of information of the topic. In the section Protective Devices it is our intention to include The Therapeutic Device.

With kind regards

# Lifeshields

## EM Radiation is Harmful

### Appendix 1

#### Physiology of the Living Cell

*Life at the Cell and Below-Cell level - Gilbert N. Ling*

*Revolution in the Physiology of the Living Cell - Gilbert N. Ling*

*Gilbert Ling has a thesis which is named AIH (Associated-Induction Hypothesis). A brief description follows.*

"Having the correct components in the right proportion is a necessary but not a sufficient condition to produce a living cell. Each of the components must also occupy a specific position in relation to the other components. But even this is not sufficient to produce a living cell - a well-preserved dead cell may also satisfy this criteria. In AI hypothesis, this assembly of the right number and kind of atoms, molecules and ions, each occupying the right relative spatial location, must also exist in a discrete state - in the sense the word is used to indicate, say, the liquid or solid state - called the living state, with high (negative) energy and low entropy."

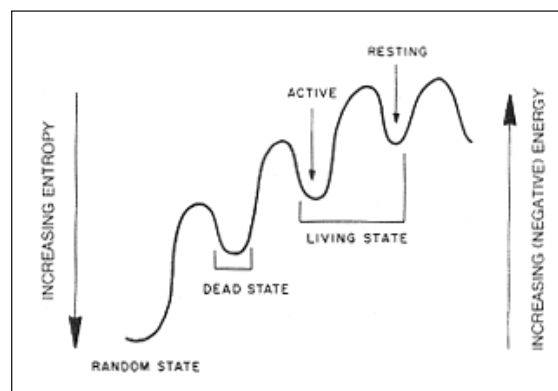
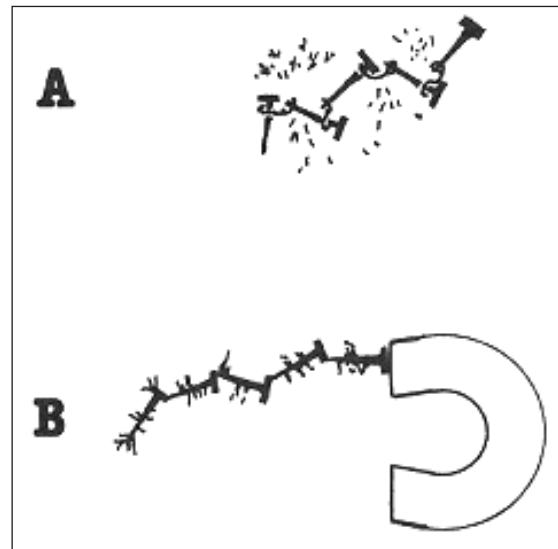
#### A simple model

Consider a collection of soft-iron nails tied end-to-end with string and amongst them iron filings. The random nature is shown in picture A. Then a magnet is brought into contact with the end nail, this in turn draws and magnetises the next, and so on. The result is that the nails are tightly linked and the iron filings also form organized patterns rather than a random pattern. This is shown in picture B. The magnet either tightens or loosens the bonds depending on its strength. When the magnet in contact the assembly as a whole can be considered a discrete high (negative) energy entity with less randomness or lower entropy state.

In living cells, according to the AI hypothesis, electrical polarization, or induction (hence the title association-induction hypothesis), takes the place of the magnetic polarization in the model discussed. The polypeptide chains of proteins are the equivalent of the chains of nails: water molecules and  $K^+$  are the iron filings. The equivalent of the magnet is a class of biologically potent substances of prime importance. These are called cardinal adsorbents. Cardinal adsorbents including drugs, hormones, transmitters and  $Ca^{++}$ . One unique cardinal adsorbent of the greatest importance in maintaining the living cell in the specific and discrete high (negative) energy, low entropy living state is the final product of cell metabolism: ATP

In summary the state of a cell being alive does not mean continued functional activity of one sort or another. Rather, it means the cell exists in the specific discrete

high (negative) energy, low entropy state called the living state. The other states, apart from the living state, are active (living) state and death and these represent discrete metastable equilibrium states of increasing high entropy and lower (negative) energy, tending toward the ultimate random state.



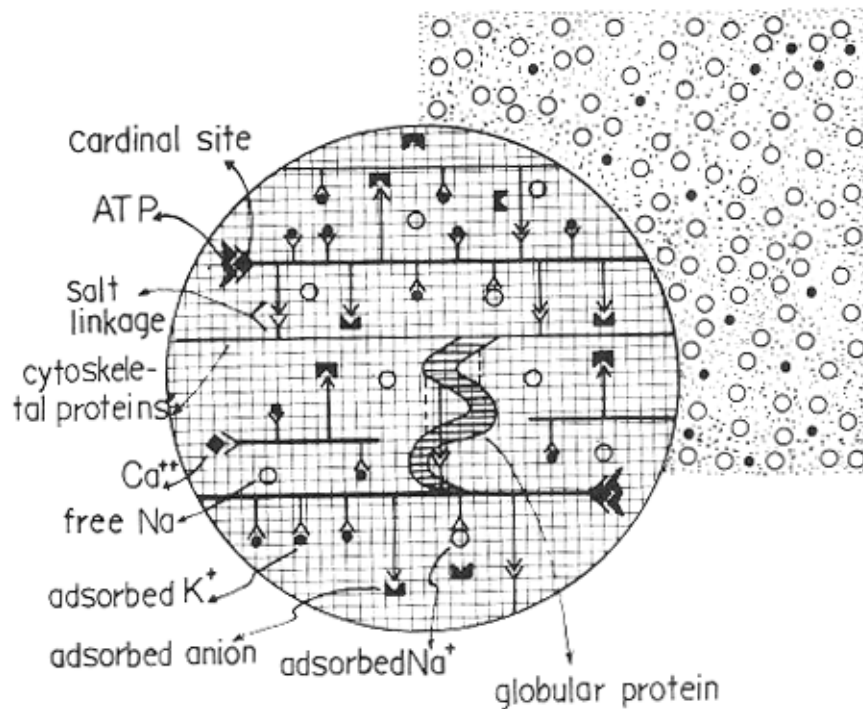
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## EM Radiation is Harmful

The asymmetric distribution of  $K^+$  and  $Na^+$  is important. First  $K^+$  and  $Na^+$  are major components of the cell and its environment, respectively. Secondly, their characteristic distribution is at once all weathervane and the substance of the living state. Therefore the unique pattern of  $K^+$  and  $Na^+$  distribution will continue to be my focus for the presentation of the AI hypothesis as a general theory of the living cell.

The following is a theoretical diagram of the living cell. Note that the membrane, mitochondria and other subcellular structures are not represented.

Rather the illustration is to be seen as representative of the general make up of all parts of the living cell. Unfortunately, static diagrams like this and others similar to it invariably do not convey the dynamic structure fluctuating in the four dimensional time and space continuum.



# Lifeshields

## EM Radiation is Harmful

### Appendix 2

#### ATP: The Perfect Energy Currency for the Cell

*Jerry Bergman, Ph.D.*

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**A critically important macromolecule-arguably "second in importance only to DNA"- is ATP.** ATP is a complex *nanomachine* that serves as the primary energy currency of the cell (Trefil, 1992, p.93). A nanomachine is a complex precision microscopic-sized machine that fits the standard definition of a machine. ATP is the "most widely distributed high-energy compound within the human body" (Ritter, 1996, p. 301). This ubiquitous molecule is "used to build complex molecules, contract muscles, generate electricity in nerves, and light fireflies. All fuel sources of Nature, all foodstuffs of living things, produce ATP, which in turn powers virtually every activity of the cell and organism. Imagine the metabolic confusion if this were not so: Each of the diverse foodstuffs would generate different energy currencies and each of the great variety of cellular functions would have to trade in its unique currency" (Kornberg, 1989, p. 62).

ATP is an abbreviation for *adenosine triphosphate*, a complex molecule that contains the nucleoside *adenosine* and a tail consisting of three phosphates. (See Figure 1 for a simple structural formula and a space filled model of ATP.) As far as known, all organisms from the simplest bacteria to humans use ATP as their primary energy currency. The energy level it carries is just the right amount for most biological reactions. Nutrients contain energy in low-energy covalent bonds which are not very useful to do most of kinds of work in the cells.

These low energy bonds must be translated to high energy bonds, and this is a role of ATP. A steady supply of ATP is so critical that a poison which attacks any of the proteins used in ATP production kills the organism in minutes. Certain cyanide compounds, for example, are poisonous because they bind to the copper atom in cytochrome oxidase. This binding blocks the electron transport system in the mitochondria where ATP manufacture occurs (Goodsell, 1996, p.74).

#### How ATP Transfers Energy

Energy is usually liberated from the ATP molecule to do work in the cell by a reaction that removes one of the phosphate-oxygen groups, leaving adenosine diphosphate (ADP). When the ATP converts to ADP, the ATP is said to be spent. Then the ADP is usually immediately recycled in the mitochondria where it is recharged and comes out again as ATP. In the words of Trefil (1992, p. 93) "hooking and unhooking that last phosphate [on ATP] is what keeps the whole world operating."

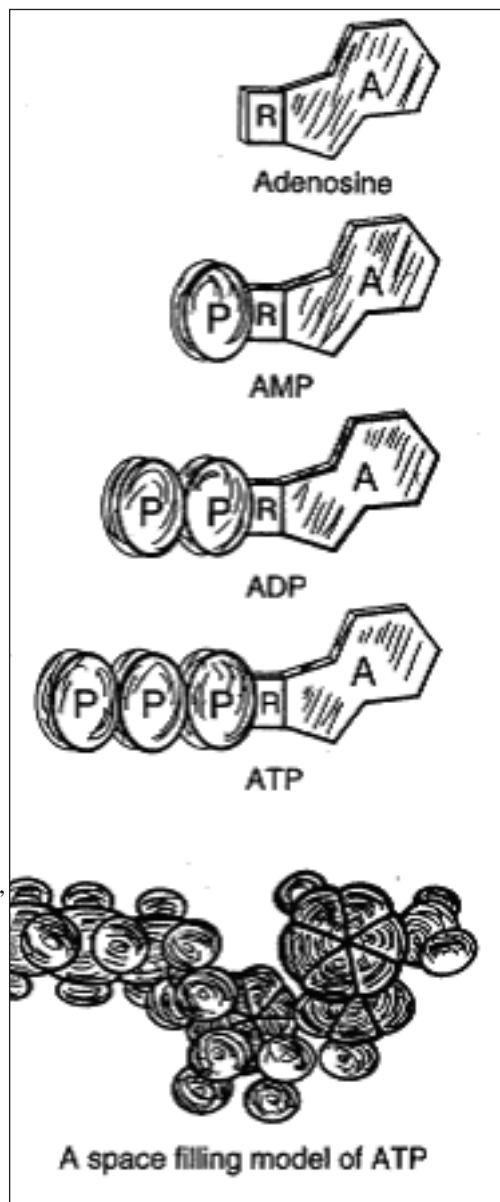


Fig. 1. Views of ATP and related structures

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The enormous amount of activity that occurs inside each of the approximately one hundred trillion human cells is shown by the fact that at any instant each cell contains about one billion ATP molecules. This amount is sufficient for that cell's needs for only a few minutes and must be rapidly recycled. Given a hundred trillion cells in the average male, about  $10^{23}$  or one sextillion ATP molecules normally exist in the body. For each ATP "the terminal phosphate is added and removed 3 times each minute" (Kornberg, 1989, p. 65).

The total human body content of ATP is only about 50 grams, which must be constantly recycled every day. The ultimate source of energy for constructing ATP is food; ATP is simply the carrier and regulation-storage unit of energy.

#### **Conclusion**

The cell infrastructure functions at very low energy levels and is susceptible to both **electrical and magnetic interference**. It is this external interference that causes a disruption to the cell communication and ATP function. The potential of cell (negative) energy is decreased and this also increases the degree of entropy. This leads to the initiation of cancer cells and the possibility of DNA distortion. Cells not being able to change to the active state leads to the decrease of energy in the body. This will reduce the immune systems effectiveness, slows recovery from illness and will eventually lead to a degraded cellular system.

# Lifeshields

## EM Radiation is Harmful

### Appendix 3

#### ISIS

The biological effects of extremely low frequency electromagnetic fields (ELF-EMF) have been a concern since Wertheimer and Leeper (1) reported that children living in homes with an excess of electrical wiring configurations suggestive of high current-flow had a higher incidence of cancer. However, subsequent *in vivo*, *in vitro*, and epidemiological studies have produced varying results that often conflict with each other (2-7). Whether ELF-EMF exposure is correlated with human cancer is controversial and therefore needs further research.

Carcinogenesis involves the irreversible genetic alteration of a single cell (initiation), followed by the clonal expansion of that initiated cell (promotion), and the ultimate conversion of these cells to invasive and metastatic neoplastic cells (8). Mutation of DNA plays an important role in carcinogenesis as evidenced by hereditary mutations predisposing humans to cancer, known mutagens being effective initiators of carcinogenesis, and mutations found in the protooncogenes and tumor-suppressor genes in cells of tumors (8).

If ELF-EMF contributes to cancer, then it is important to determine the stage or stages of carcinogenesis that it affects. Most studies indicate that ELF-EMF is a nonionizing form of radiation that is too weak to induce thermal effects; therefore, it cannot damage or mutate DNA and lead to mutagenesis (9,10). A few studies have been interpreted as indicating either mutagenic or comutagenic activity (11,12). However, the weight of the evidence indicates that ELF-EMF exposure would be an extremely weak initiator, if not a noninitiator, of carcinogenesis.

Assuming that ELF-EMF plays a role in the carcinogenic process but that it is not a carcinogenic initiator, it follows that ELF-EMF is likely to be involved in the promotional phase of cancer. The promotional phase of carcinogenesis consists of nonmutagenic and epigenetic mechanisms (13). These mechanisms entail the alteration of gene expression at the transcriptional level (e.g., methylation of DNA or acetylation of DNA-binding proteins), translational level (e.g., alternative splicing or stability of mRNA), or posttranslational level (e.g., protein modification such as phosphorylation).

Most tumor promoters are not mutagenic (e.g., phenobarbital, phorbol esters, polybrominated biphenyls, saccharin, peroxisome proliferators, TCDD, DDT) (14), but can alter differentiation (15), inhibit apoptosis (16,17), induce various signal transduction pathways (e.g., protein kinase C, mitogen activated protein kinases) (18), and activate gene expression (19). Similar to tumor-promoting chemicals, ELF-EMF can also alter the transcription and translation of genes such as *hsp70*, *myc*, *jun*, and *fos* (20-23).

# Lifeshields

## EM Radiation is Harmful

### Appendix 4

#### National Radiation Protection Board

In March 2002, a study commissioned by the National Radiation Protection Board (NRPB) in the United Kingdom found that exposure to EMFs of 0.4 mTesla (4 mG) or greater doubles the risk of childhood leukaemia (see "Electromagnetic fields double leukaemia risks", [SiS 17](#)). But the study failed to draw any firm conclusions because of the absence of any proven biological mechanisms by which such low levels of non-ionising electromagnetic radiation can trigger cancer. (It is now generally accepted that ionising radiation damages DNA and is linked to cancers.) The results were downplayed also on grounds that very few children would live in homes with EMFs in excess of 0.4mT, though this is debatable (see later).

#### EMF and childhood leukaemia more strongly linked than appears

The link between childhood leukaemia and EMF may be far stronger than appears from the epidemiological studies.

Court Brown and Richard Doll noted in a paper published in 1961 that a new agent causing leukaemia had been introduced first into Britain about 1920 and later into the United States and other countries. A new peak in childhood leukaemia deaths between the ages two and four had emerged in the UK in the 1920s, and in the 50 years starting 1911, leukaemia mortality at ages under 10 had increased an average of 4.5% per year. At a conference organised by the charity Children with Leukemia in London, UK, in September 2004, an entire day was devoted to the link between EMF and childhood leukaemia. Among the speakers was Dr. Sam Millham of Washington State Department of Health in the United States, who described the remarkable correlation between the emergence of childhood leukaemia and the electrification of homes, which began in the 1920s in the UK and lightly later in the US. In the US, electrification of farms and rural areas lagged behind urban areas until 1958, so there is plenty of opportunity to compare mortality rates due to childhood leukaemia in the death registers that were kept.

In the period 1920 to 1960, death from childhood leukaemia between 2-4 years rose from a base line of less than 2 per 100 000 to about 8 per 100 000 among white children only. No such peak is evident for black children in the same period, or for Japanese children, reported in other studies. During 1928-1932, in states with over 75% of homes electrified, leukaemia mortality increased with age for single years for the ages 0 to 4 years, while states with electrification of homes below 75% showed a decreasing trend.

During 1949-1951, all states showed a peak in leukaemia mortality at ages 2-4. At age 0-1, leukaemia mortality was not related to electrification levels. But at ages 2-4, there was a 24% increase in leukaemia mortality for each 10% increase in homes electrified. The peak of leukaemia at ages 2-4 is made up of a single leukaemia subtype, common acute lymphoblastic leukaemia. By this time, the same peak of childhood leukaemia deaths had emerged in black and Japanese children.

Millham and Osslander commented that worldwide, the emergence of this peak tracked electrification. So, even today, places without electricity do not show this peak. They criticised the EMF/cancer epidemiology studies that were done long after electrification, which show a deceptively low (2 to 3 fold) risk with increased exposure to EMFs, simply because there are no truly unexposed control groups on which to make the comparison. Consequently, they estimate that for childhood leukaemia between ages 2 to 4, about 75% could be linked to EMF exposure, possibly in the mother's womb.

# **Lifeshields**

## **EM Radiation is Harmful**

### **Appendix 5**

#### **DNA damage in brain cells blocked by anti-oxidants**

Other biological effects have emerged.

In January 2004, Henry Lai and Narendra Singh of the Bioelectromagnetics Research Laboratory in the University of Washington in Seattle, USA, reported that exposing rats to weak 60 Hz magnetic fields caused DNA breaks in their brain cells and brain-cell death; and furthermore, the DNA damage can be blocked by antioxidants. This suggests that magnetic fields somehow caused the accumulation of oxidative free radicals, which damaged the DNA, leading to cell death.

Lai and Singh had earlier found that rats exposed to a 60 Hz sinusoidal magnetic field for 2 hours at flux density of 0.1 mT (1G) showed an increase in DNA single-strand breaks in their brain cells, whereas an increase in double-strand breaks was found at 0.25mT or greater. Several subsequent investigations have confirmed DNA breakages in a number of different cell lines as the result of exposure to 50 or 60Hz magnetic fields, although other studies failed to confirm the findings.

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## EM Radiation is Harmful

### Appendix 6

#### Faraday

Michael Faraday (1791-1867) came from a poor family in London. He had no formal education. Yet he revolutionized the field of physics with his iconoclastic concepts of curved electric and magnetic lines of force and his field theory. He was almost entirely rejected by his peers. Some even suggested that "he ought to return to sixth form mathematics before venturing into the deep ocean of Laplacian physics." (54 p 507) But there were also striking exceptions.

William Thompson (Lord Kelvin) and especially James Clerk Maxwell both recognized the importance of Faraday's revolutionary concepts. Later Maxwell was to introduce his own famous theory of light as electromagnetic waves, which marked one of the great forward leaps in physics. Yet through it all, Maxwell always insisted that the core of Maxwell's advanced field theory were the ideas Faraday expressed in his life's work. (54 p 509, p 513) Thus Step 2 of another major scientific revolution was once more successfully carried out.

Eighty nine years after Faraday's death, Albert Einstein - possibly the greatest scientist of all times - wrote: "For us, who took in Faraday's ideas so to speak with our mother's milk, it is hard to appreciate their greatness and audacity." (365 p 101) And Faraday did all these "without the help of a single mathematical formula." (537 p.1)

# Lifeshields

## EM Radiation is Harmful

### Appendix 7

#### Leukocyte

##### White Blood Cell (WBC)

Leukocytes or white blood cells (WBC) are cells in the blood that are involved in defending the body against infective organisms and foreign substances. Like all blood cells, they are produced in the bone marrow. There are 5 main types of white blood cell, subdivided between 2 main groups:

1. Polymorphonuclear Leukocytes (granulocytes):
  - Neutrophils
  - Eosinophils
  - Basophils
2. Mononuclear Leukocytes:
  - Monocytes
  - Lymphocytes

**White blood cells** are the principal components of the immune system and function by destroying "foreign" substances such as bacteria and viruses. When an infection is present, the production of WBCs increases. If the number of leukocytes is abnormally low (a condition known as leukopenia), infection is more likely to occur and it is more difficult for the body to get rid of the infection.

**White Blood Cell Count.** Measures the number of white blood cells in a microliter of blood. Normal values range from 4100/ml to 10900/ml but can be altered greatly by factors such as exercise, stress and disease. A low WBC may indicate viral infection or toxic reactions. A high WBC count may indicate infection, leukemia, or tissue damage. An increased risk of infection occurs once the WBC drops below 100/ml.

**WBC Differential.** Determines the percentage of each type of white blood cell in a sample. Multiplying the percentage by the total count of white blood cells indicates the actual number of each type of white blood cell in the sample.

Normal values are:

Type	Percentage	Number
Neutrophil	50 - 60%	3,000 - 7,000
Eosinophils	1 - 4%	50 - 400
Basophils	0.5 - 2%	25 - 100
Lymphocytes	20 - 40%	1,000 - 4,000
Monocytes	2 - 9%	100 - 600

A serious infection can develop once the total neutrophil count (% neutrophils time total WBC count) drops below 50/ml

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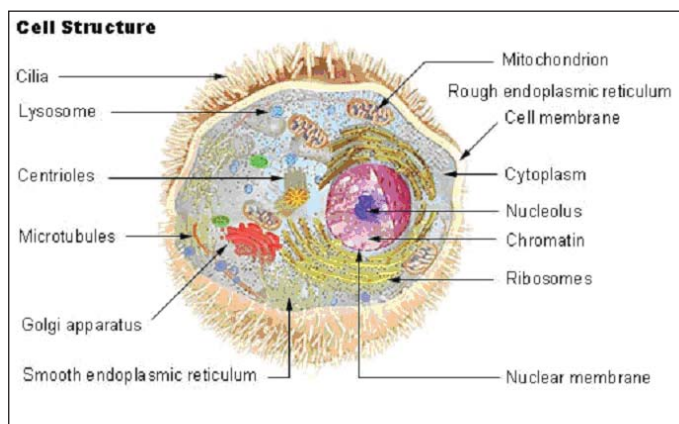
## EM Radiation is Harmful

### Appendix 8

#### Cell Structure

Ideas about cell structure have changed considerably over the years. Early biologists saw cells as simple membranous sacs containing fluid and a few floating particles. Today's biologists know that cells are infinitely more complex than this.

There are many different types, sizes, and shapes of cells in the body. For descriptive purposes, the concept of a "generalized cell" is introduced. It includes features from all cell types. A cell consists of three parts: the cell membrane, the nucleus, and between the two, the cytoplasm. Within the cytoplasm lie intricate arrangements of fine fibers and hundreds or even thousands of miniscule but distinct structures called organelles.



#### Cell membrane

Every cell in the body is enclosed by a cell (Plasma) membrane. The cell membrane separates the material outside the cell, extracellular, from the material inside the cell, intracellular. It maintains the integrity of a cell and controls passage of materials into and out of the cell. All materials within a cell must have access to the cell membrane (the cell's boundary) for the needed exchange.

The cell membrane is a double layer of phospholipid molecules. Proteins in the cell membrane provide structural support, form channels for passage of materials, act as receptor sites, function as carrier molecules, and provide identification markers.

#### Nucleus and Nucleolus

The nucleus, formed by a nuclear membrane around a fluid nucleoplasm, is the control center of the cell. Threads of chromatin in the nucleus contain deoxyribonucleic acid (DNA), the genetic material of the cell. The nucleolus is a dense region of ribonucleic acid (RNA) in the nucleus and is the site of ribosome formation. The nucleus determines how the cell will function, as well as the basic structure of that cell.

#### Cytoplasm

The cytoplasm is the gel-like fluid inside the cell. It is the medium for chemical reaction. It provides a platform upon which other organelles can operate within the cell. All of the functions for cell expansion, growth and replication are carried out in the cytoplasm of a cell. Within the cytoplasm, materials move by diffusion, a physical process that can work only for short distances.

# **Lifeshields**

## **EM Radiation is Harmful**

### **Cytoplasmic organelles**

Cytoplasmic organelles are "little organs" that are suspended in the cytoplasm of the cell. Each type of organelle has a definite structure and a specific role in the function of the cell. Examples of cytoplasmic organelles are mitochondrion, ribosomes, endoplasmic reticulum, golgi apparatus, and lysosomes.

# Lifeshields

## EM Radiation is Harmful

### Appendix 9

#### Glossary

This is taken from the glossary in Life at the Cell and below the cell level.

$K^+$  potassium cation, (positively-charged) potassium ion

$Na^+$  sodium

#### Glossary of Retinal Degenerative Disease Research

**Angiogenesis:** Also called neovascularization, refers to the growth of new blood vessels into tissue. When uncontrolled, angiogenesis can cause destruction in normal tissues due to leakage. Angiogenesis is associated with the wet form of age-related macular degeneration and is called choroidal neovascularization (see choroid below).

**Antioxidant:** a substance that protects components of a cell from oxidative damage that may occur from light, stress, or metabolic processes. Some well known antioxidants include compounds normally present in food such as, vitamin E, beta-carotene, the carotenoids lutein and zeaxanthin, vitamin C, zinc, and selenium

**Apoptosis or Programmed Cell Death:** A genetically controlled process that causes degenerating photoreceptor cells (or any other cell type) to die. Apoptosis is common to all retinal degenerative diseases. It is hoped that an understanding of apoptosis will lead to sight-saving therapies that prevent or delay photoreceptor cell death

**Autosomal Dominant Disease:** The affected person has one altered gene paired with one normal gene. These genes lie on one of the 22 pairs of autosomal chromosomes (see autosome below). Approximately 20 percent of all families with RP have an autosomal dominant inheritance pattern.

**Autosome:** A chromosome (see chromosome below) that is not a sex chromosome ("X" or "Y"). Autosomal recessive and autosomal dominant diseases are caused by mutations in genes that reside on one of the 22 paired autosomes

**Axokine:** A survival factor. Axokine is a genetically altered form of the survival factor known as ciliary neurotrophic factor (CNTF).

Survival factors are naturally-occurring substances that promote the health of nerve cells such as photoreceptors. Axokine has delayed retinal degeneration in a variety of animal models with retinal degeneration.

**Cell:** The smallest biological unit of specialized function capable of self-replication. A cell consists of an outer membrane, which encases the fluid of the cell, and the nucleus, a specialized compartment containing DNA

**Choroid:** The tissue layer that sits just below the retinal pigment epithelial cells (RPE). The choroid is rich in blood vessels and connective tissue, and is a major supplier of oxygen and nutrients to the RPE and photoreceptor cells.

**Chromosome:** One of the threadlike "packages" of genes in the nucleus of a cell. A chromosome is mainly composed of DNA. Humans have 23 pairs of chromosomes (22 pairs of autosomes and one pair of sex chromosomes). Each parent contributes one chromosome to each child, so children get half of their chromosomes from their mothers and half from their father

# Lifeshields

## EM Radiation is Harmful

**Cone Cell:** A type of photoreceptor cell. Although cones are present throughout the retina, they densely populate the macula, the central portion of the retina. Cone cells are particularly important for color vision and discriminating fine visual detail.

**Cortical Implant:** A microelectrode chip implanted in the visual cortex, the portion of the brain that interprets visual information. This device would theoretically transmit visual images from a camera-like device to the brain. The goal of this device is similar to the retinal chip and could possibly restore ambulatory vision to patients with end-stage retinal degeneration.

**DHA (docosahexaenoic acid):** A highly unsaturated fatty acid that is greatly concentrated in rod photoreceptor cells. Foundation-supported scientists have found that patients with some forms of RP and Usher syndrome have lowered serum levels of DHA. A clinical trial is currently in progress to test whether DHA used as a nutritional supplement can slow the progression of X-linked RP

**DNA:** The long chain of molecules that carries the genetic instructions (genes) for making living organisms. DNA is found in the nucleus where it is organized into highly specific sequences that define each gene on the 23 chromosomes

**Drusen:** Yellow-white deposits found under the macula. Drusen deposits are associated with the dry form of macular degeneration. They are thought to be an accumulation of waste materials.

**Free Radical:** A molecule that can cause oxidative damage to a cell or tissue. Antioxidants are used to destroy free radicals.

**Gene:** An organized sequence of molecules that "spells out" the information necessary to construct a specific messenger called "messenger RNA" which, in turn, makes a specific protein. Every cell requires a host of genes that act as blueprints to produce highly specialized proteins that are essential to the cell's function. For example, the genes ROM-1 and peripherin are important in forming the outer segment membranes of photoreceptor cells. Other proteins, like rhodopsin, are involved in a rod cell's response to light.

**Gene Mapping:** The process of identifying a specific region along one of the 23 paired chromosomes that contains a gene with a disease-causing mutation. Also known scientifically as "positional cloning".

**Gene Therapy:** The delivery of a gene or genetic information into cells for the purpose of achieving a therapeutic effect. Two forms of gene therapy-gene replacement therapy and ribozyme therapy-have shown promise in the treatment of retinal degenerative diseases.

**Genotyping:** The process of screening patients to identify the specific gene and the specific error (mutation) in a gene that causes a disease.

**Lutein and Zeaxanthin:** Antioxidant nutrient substances belonging to the carotenoid family. Lutein and zeaxanthin are abundant in green leafy vegetables and yellow fruits and vegetables. These pigmented carotenoids are highly concentrated around the macula and give the macula its characteristic yellow appearance. Lutein and zeaxanthin are thought to protect the macula from oxidative stress due to ultraviolet light exposure.

**Macula:** The central portion of the retina. The macula contains a dense concentration of cone photoreceptor cells that help us see fine visual detail and color vision. Only primates (human and monkey) have maculas.

**Mutation:** A truncation or change in the normal order of molecules in DNA that defines a specific gene. A disease-causing mutation in a gene alters the gene blueprint and thus ultimately disrupts the construction of the normal protein encoded by the gene.

**Oxidative Stress:** A process whereby the metabolic balance of a cell is disrupted by exposure to environmental substances resulting in accumulation of free-radicals, which can damage the cell.

# Lifeshields

## EM Radiation is Harmful

**Phototransduction:** The cascade of biochemical reactions involved in detecting light and converting it to an electrical signal that is relayed to the brain via the optic nerve.

**Retina:** The retina is a thin tissue at the back of the eye that contains several cell types that are similar to brain cells since they are all neurons. The cell types include photoreceptor neurons (rods and cones) and other types of neurons. The photoreceptor cells of the retina absorb light and convert this light to electrical signals. The electrical signals are transferred from the photoreceptors to secondary neurons which then send the electrical signals to the visual cortex region of the brain for interpretation. The brain and retina constitute the Central Nervous System of the body.

**Rod Cell:** A type of photoreceptor cell that is located throughout the retina but is more common outside of the central macular region of the retina, i.e. the periphery of the retina. The rod cell is particularly important for night vision, black and white vision, and side or peripheral vision. In many forms of RP, rod cell loss leads to loss of peripheral vision (i.e., tunnel vision)

**Stem Cell:** A primitive, unspecialized cell that has the capacity to develop highly specialized function when grown in the appropriate environment and treated with specific growth factors. Stem cells for the retina reside in the ciliary body, a specialized structure that sits on either side of the iris, near the retina. They usually lie dormant in the adult. Stem cells have now been isolated and are being evaluated as a potential source for RPE and photoreceptor cells for transplants.

**X-chromosome:** Of the 23 pairs of chromosomes that humans carry in each cell of their body, genes on a single pair of chromosomes (called X and Y) determine the gender of the fetus. A female is only capable of transmitting the X chromosome to her offspring since females always have two X chromosomes (XX), while males can transmit either an X or a Y chromosome to an offspring since males always have one X and one Y chromosome (XY). Importantly, the X-chromosome also contains many other genes that have nothing to do with determination of gender. Mutations in these genes on the X-chromosome result in diseases that are transmitted to male offspring (who have a single X-chromosome) through the maternal line. These are called X-linked diseases. Females can be carriers of the mutated genes but seldom show signs of the disease since they bear another X chromosome that does not have the same mutation and thus produces a normal protein.

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## EM Radiation is Harmful

### Appendix 10

#### Effect caused by specific pathology

In March 2002, a study commissioned by the National Radiation Protection Board (NRPB) in the United Kingdom found that exposure to EMFs of 0.4  $\mu$ Tesla (4 mG) or greater doubles the risk of childhood leukaemia (see "Electromagnetic fields double leukaemia risks", *SiS 17*). But the study failed to draw any firm conclusions because of the absence of any proven biological mechanisms by which such low levels of non-ionising electromagnetic radiation can trigger cancer. (It is now generally accepted that ionising radiation damages DNA and is linked to cancers.) The results were downplayed also on grounds that very few children would live in homes with EMFs in excess of 0.4 $\mu$ T, though this is debatable (see later).

#### EMF and childhood leukaemia more strongly linked than appears

But the link between childhood leukaemia and EMF may be far stronger than appears from the epidemiological studies.

Court Brown and Richard Doll noted in a paper published in 1961 that a new agent causing leukaemia had been introduced first into Britain about 1920 and later into the United States and other countries. A new peak in childhood leukaemia deaths between the ages two and four had emerged in the UK in the 1920s, and in the 50 years starting 1911, leukaemia mortality at ages under 10 had increased an average of 4.5% per year.

At a conference organised by the charity Children with Leukemia in London, UK, in September 2004, an entire day was devoted to the link between EMF and childhood leukaemia. Among the speakers was Dr. Sam Millham of Washington State Department of Health in the United States, who described the remarkable correlation between the emergence of childhood leukaemia and the electrification of homes, which began in the 1920s in the UK and lightly later in the US. In the US, electrification of farms and rural areas lagged behind urban areas until 1958, so there is plenty of opportunity to compare mortality rates due to childhood leukaemia in the death registers that were kept.

In the period 1920 to 1960, death from childhood leukaemia between 2-4 years rose from a base line of less than 2 per 100 000 to about 8 per 100 000 among white children only. No such peak is evident for black children in the same period, or for Japanese children, reported in other studies. During 1928-1932, in states with over 75% of homes electrified, leukaemia mortality increased with age for single years for the ages 0 to 4 years, while states with electrification of homes below 75% showed a decreasing trend.

During 1949-1951, all states showed a peak in leukaemia mortality at ages 2-4. At age 0-1, leukaemia mortality was not related to electrification levels. But at ages 2-4, there was a 24% increase in leukaemia mortality for each 10% increase in homes electrified. The peak of leukaemia at ages 2-4 is made up of a single leukaemia subtype, common acute lymphoblastic leukaemia. By this time, the same peak of childhood leukaemia deaths had emerged in black and Japanese children.

Millham and Osslander commented that worldwide, the emergence of this peak tracked electrification. So, even today, places without electricity do not show this peak. They criticised the EMF/cancer epidemiology studies that were done long after electrification, which show a deceptively low (2 to 3 fold) risk with increased exposure to EMFs, simply because there are no truly unexposed control groups on which to make the comparison. Consequently, they estimate that for childhood leukaemia between ages 2 to 4, about 75% could be linked to EMF exposure, possibly in the mother's womb.

# Lifeshields

## EM Radiation is Harmful

### Appendix 11

#### DNA damage in brain cells blocked by anti-oxidants

In January 2004, Henry Lai and Narendra Singh of the Bioelectromagnetics Research Laboratory in the University of Washington in Seattle, USA, reported that exposing rats to weak 60 Hz magnetic fields caused DNA breaks in their brain cells and brain-cell death; and furthermore, the DNA damage can be blocked by antioxidants. This suggests that magnetic fields somehow caused the accumulation of oxidative free radicals, which damaged the DNA, leading to cell death.

Lai and Singh had earlier found that rats exposed to a 60 Hz sinusoidal magnetic field for 2 hours at flux density of 0.1  $\mu\text{T}$  (1G) showed an increase in DNA single-strand breaks in their brain cells, whereas an increase in double-strand breaks was found at 0.25 $\mu\text{T}$  or greater. Several subsequent investigations have confirmed DNA breakages in a number of different cell lines as the result of exposure to 50 or 60Hz magnetic fields, although other studies failed to confirm the findings.

In one study, an increase in DNA double-strand breaks were found in the brain cells of mice exposed to 7.5 $\mu\text{T}$  magnetic fields for 32 days [4], and after 14 days at 0.5 $\mu\text{T}$ . Thus, the effects appear to be cumulative. In human fibroblasts, continuous exposure at 1  $\mu\text{T}$  produced no significant effect, while intermittent exposure (5 min on and 10 min off) produced an increase in DNA single- and double-strand breaks.

Lai and Singh had found in their 1997 study that if they gave the rats melatonin and a 'spin-trap' compound (N-tert-butyl-a-phenylnitron), both of which scavenge oxidative free radicals, these appear to protect their brain cells against the DNA damage caused by the magnetic fields.

In the new series of experiments, they included a lower field exposure of 0.01 $\mu\text{T}$  (0.1G) for 24h or 48h. Increases in single and double strand breaks were already observed at 24h, with larger increases at 48h, again indicating the cumulative nature of the effects.

In brains of rats exposed to magnetic field at 0.5 $\mu\text{T}$  for 2 h, significant increases were found, by about 2-fold in both apoptosis ('programmed' cell death initiated by the cell itself) and necrosis (cells killed otherwise). The antioxidant Trolox (vitamin E analogue) and 7-nitroindazole (an inhibitor of the enzyme that makes nitric oxide, another free radical) and the iron chelator, deferiprone, all blocked the effects of the magnetic field on DNA breaks.

#### Mechanism emerging for EMF effects?

Lai and Singh proposed that the magnetic field initiates an iron-mediated process that increases free radical formation in the brain cells, leading to DNA damage and cell death. In addition to DNA damage, free radicals can cause damage to other biological molecules such as lipids and proteins and other cell functions. How does iron get involved? It is involved in the 'Fenton' reaction, which converts hydrogen peroxide to the more potent and toxic hydroxy radical, and iron-induced oxidant formation is known to cause DNA strand breaks, DNA-protein cross-links and many other effects. They suggest that cells with high rates of iron intake such as proliferating cells, cells infected by viruses, and cells with high metabolic rates such as brain cells, would be more susceptible to the effects of magnetic fields on DNA.

The human brain contains relatively high amounts of non-heme iron, probably required in the production and maintenance of myelin, and increased risk of neurodegenerative diseases due to magnetic field exposure could be a result of the death of neurons and glial cells or demyelination. Lai and Singh further pointed out that occupational exposure to extremely low-frequency electromagnetic fields have been associated with increased risks of neurodegenerative diseases including amyotrophic lateral sclerosis, Alzheimer's disease and Parkinson's disease.

# Lifeshields

## EM Radiation is Harmful

### Appendix 12

#### Recommended exposure limits inadequate

Household and office levels of extremely low-frequency magnetic fields vary between 0.01 to 1  $\mu\text{T}$ , with intermittent levels of more than 10  $\mu\text{T}$ . Levels near a power transmission line are between 10-30 $\mu\text{T}$ , where as it could vary between 0.1 to 1 $\mu\text{T}$  near some electrical appliances such as electric blankets and hair dryers. Much higher levels are expected in occupational exposures.

The UK NRPB has lowered its previous recommended exposure limits to those of the ICNIRP (International Commission on Non-Ionizing Radiation Protection, an organization of 15 000 scientists from 40 nations). These limits vary with frequency, from 0.04T at up to 1Hz to 0.2  $\mu\text{T}$  or 10W/m<sup>2</sup> at 300GHz for the general public, while the occupational limits are respectively 0.2T and 0.45 microT or 50W/m<sup>2</sup>. For 60Hz EMF, the limit is 0.833G for the general public and 4.2G occupational. As can be seen, these limits are inadequate to prevent DNA damage in brain cells and other associated effects. They are aimed at preventing 'thermal effects' of body tissues over-heating, and not on non-thermal effects. One major (mistaken) argument against weak fields having any effects at all is that they are energetically below the level of random thermal motions, which applies to dead tissues or otherwise lifeless systems.

In his talk given to the Children with Leukemia conference, Lai presented findings showing that cancer cells may be even more susceptible to the EMFs than normal cells, thus offering the prospect that EMFs may be used for cancer therapy, if only one knew how to prevent 'collateral' damage to non-cancer cells.

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## EM Radiation is Harmful

### Appendix 13

#### **Non-thermal biological effects no longer in doubt but still in need of explanation**

There is little doubt that EMFs over a whole range of frequencies can have biological effects. But the precise mechanism remains elusive. Geneticists latch onto 'susceptibility' genes, biochemists to specific ions, such as iron or calcium, or molecules such as free radicals or heat shock proteins.

Molecular changes associated with exposure to EMFs tell us little about the basic physics of how EMFs can bring about such changes. And so the effects of weak EMFs remain within the realm of phenomenology with contradictory findings, like the related efficacy of homeopathy and other 'subtle' energy medicine.

I also showed how that is consistent with the thesis of Gilbert Ling [14] - the result of 50 years of brilliant research almost totally ignored by the scientific establishment - that the cell is an exquisite "electronic machine" interconnected by long-range induction of electron density changes that affect the state of the cell through the extended protein matrix with its polarised layers of ordered cell water (see "Strong medicine for cell biology", to appear).

In October, 2002, cell biologist Fiorenzo Marinelli and his team at the National Research Council in Bologna, Italy, reported that radio waves from mobile phones could promote the growth of cancer cells.

The team exposed leukaemia cells to 900-megahertz radio waves at a power density level of 1 milliwatt per squared centimetre (mW/cm<sup>2</sup>).

After 24 hours of continuous exposure to the radio waves, the researchers found that certain 'suicide genes' were turned on in far more leukaemia cells than in a control cell population that had not been exposed, and 20 per cent more exposed cells had died than in the controls.

But after 48 hours exposure to the radio waves, the apparently lethal effect of the radiation went into reverse. Instead of more cells dying, the exposed cells were replicating furiously compared to the controls. Three genes that trigger cells to multiply were turned on in a high proportion of the cells. The cancer, although briefly beaten back, had become more aggressive.

Marinelli presented the results at the International Workshop on Biological Effects of Electromagnetic Fields on the Greek island of Rhodes.

He suspects that the radiation may initially damage DNA, and that this interferes with the biochemical signals in a way that ultimately triggers the cells to multiply more rapidly.

Meanwhile, a research team in the University of Florence reported that normal human skin fibroblasts, placed over an active cell phone for one hour also showed significant changes. The fibroblasts shrivelled up, and several genes indicative of stress response became expressed, that are involved in cell proliferation, growth inhibition and cell death. There was a significant increase in DNA synthesis and in key molecules that signal cell division. These findings are similar to those reported earlier from yet another laboratory.

Dariusz Leszczynski at the Radiation and Nuclear Safety Authority in Helsinki found that one-hour exposure to mobile phone radiation caused cultured human cells to shrink.

Leszczynski believes this happens when a cell is damaged. In a person, such changes could destroy the 'blood-brain barrier' that normally prevents harmful substances in the bloodstream from entering the brain and damaging it.

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### EM Radiation is Harmful

Radiation-induced changes in the cells could also interfere with normal cell death when the cell is damaged. If cells that are 'marked' to die do not, tumours can form.

This research is particularly important, Leszczynski said, because it demonstrates that mobile phone radiation too weak to heat up the cells can still affect them.

David de Pomerai, molecular toxicologist at the University of Nottingham, provided the first clear evidence on such non-thermal effects of mobile phone radiation. He found that nematode worms exposed to radio waves had an increase in fertility - the opposite effect from what would be expected from heating.

De Pomerai also insisted that a consensus is emerging that electromagnetic waves such as those used in mobile phones can indirectly damage DNA by affecting its repair system without heating the cell. "Cells with unrepaired DNA damage are likely to be far more aggressively cancerous," he said.

Non-thermal effects due to weak electromagnetic radiation are at the heart of the debate on the health hazards of mobile phones and other electrical installations in the environment.

These recent results should be seen in the light of the report released in March 2002 by the National Radiological Protection Board (NRPB), which concluded that children exposed to high levels of electromagnetic radiation in the home could be doubling their risk of leukaemia.

One doesn't have to be a cell-phone user to become exposed to the radiation. You could be living near a base-station that's beaming the radio waves at you (see Box 1). Or you could be exposed as a passenger on a crowded train full of mobile phone users.

Tsuyoshi Hondou, a physicist from Tohoku University in Sendai, Japan, currently working at the Curie Institute in Paris, calculated that in a typical Japanese railway carriage with mobile phone users surfing the net, the radio waves rebounding from the metal wall of the carriage would give an electromagnetic field that could exceed the maximum exposure level recommended by the International Committee for Non-Ionising Radiation (ICNIRP), even when the train is not crowded.

Hondou's calculations show that it is possible to exceed ICNIRP exposure limit if 30 people, each with a mobile phone that emits radio waves at a power of 0.4 watts, all use their phones at the same time.

The ICNIRP limits have already been severely criticised for being set far too high, and are aimed at protecting people from acute heating effects only, and take no account of non-thermal effects.

An inquiry in April 2000 by the British government found no evidence of any health risks from mobile phones. But the report nevertheless recommended a precautionary approach until further evidence emerged. In particular, it suggested children should not use mobile phones excessively.

A review published in *The Lancet* the same year by Gerard Hyland, physicist at Warwick University, listed numerous studies over the past 30 years that showed microwaves do have a range of non-thermal effects (see Box 1 and Box 2).

Some of the findings, such as increases in chromosome aberrations, DNA single- and double-strand breaks, promotion of cancer in cells, and in transgenic mice, are all consistent with the recent reports. Hyland is extremely critical of the current exposure limits set by the ICNIRP.

# Lifeshields

## EM Radiation is Harmful

### Box 1

#### How do mobile phones work?

Mobile telephony is based on radio communication between a portable handset and the nearest base-station. Every base-station serves a 'cell', varying in radius from hundreds of metres in densely populated areas to kilometres in rural areas, and is connected both to the conventional landline telephone network, and by tightly focused microwave links to neighbouring stations. As the mobile-phone user moves from cell to cell, the call is transferred from one base-station to the next without interruption.

The radio communication depends on microwaves at 900 or 1800 megahertz (MHz) (a million cycles per second) to carry voice information via small modulations of the wave's frequency. A base-station antenna typically radiates 60W and a handset between 1 and 2 W (peak). The antenna of a handset radiates equally in all directions, but a base-station produces a beam that is much more directional. In addition, the stations have subsidiary beams called side-lobes, into which a small fraction of the emitted power is channeled. Unlike the main beam, the side-lobes are located in the immediate vicinity of the mast, and, despite their low power, the power density can be comparable with that of the main beam much further away from the mast.

At 150 to 200m, the power density in the main beam near the ground level is typically tenths of microWatt/cm<sup>2</sup>. A handset in operation also has a low-frequency magnetic field associated, not with the emitted microwaves, but with surges of electric current from the battery that is necessary to implement 'time division multiple access', the system used to increase the number of people who can simultaneously communicate with the base-station.

Every communication channel has 8 time slots (thus the average power of a handset is 1/8 of the peak values, ie, between 0.125 and 0.25W), which are transmitted as 576 microsecond bursts. Together, the 8 slots define a frame, the repetition of which is 217 Hz. The frames transmitted by both handsets and base-stations are grouped into 'multi-frames' of 25 by the absence of every 26th frame. This results in an additional low frequency pulsing of the signal at 8.34Hz, which, unlike that at 217 Hz, is unaffected by call density, and is thus a permanent feature of the emission. With handsets that have an energy-saving discontinuous transmission mode (DTX), there is an even lower frequency pulsing at 2 Hz, which occurs when the user is listening but not speaking. Thus, the fields to which users are exposed can be quite complex.

### Box 2

#### *In vitro* nonthermal effects of microwaves

- Elicits epileptic activity in rat brain slices in conjunction with certain drugs.
- Affects cell division of yeast and on the genome conformation of *E. coli*.
- Synchronises cell division in yeast, *S. carisbergensis*.
- Switches on l-phage and colicin synthesis in bacteria.
- Alters ornithine decarboxylase activity in cultured cell line.
- Reduces T lymphocyte cytotoxicity.
- Increases permeability of red blood cell membrane.
- Affects calcium efflux in brain cells.
- Increases chromosome aberrations and micronuclei in human blood lymphocytes.
- Promotes cancer synergistically with cancer-promoting drugs such as phorbol esters.

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## EM Radiation is Harmful

### Box 3

#### *In vivo* non-thermal effects of microwaves

- Causes epileptic activity in rats, in conjunction with certain drugs.
  - Depresses chicken immune systems (melatonin, corticosterone and IgG levels).
  - Increases mortality of chick embryos.
  - Affects brain electrochemistry (dopamine, opiates).
  - Increases DNA single- and double-strand breaks in rat brain.
  - Promotes lymphomas in transgenic mice.
  - Synergetic effects with certain psychoactive drugs.
  - A delayed increase in spectral power density (particularly in the alpha band) corroborated in the awake EEG of adults exposed to mobile phone radiation. Influences on the asleep EEG include a shortening of rem sleep during which the power density in the alpha band increases, and effects on non-REM sleep.
  - Exposure to mobile phone radiation also decreases the preparatory slow potentials in certain regions of the brain and affects memory tasks.
- Resting blood pressure was found to increase during exposure to radiofrequencies.

Dr Zenon Sienkiewicz, a radiation biologist at the National Radiological Protection Board (NRPB), told BBC News Online that there was still no hard evidence that showed mobile phones causing harm in real humans, rather than human cells in a test tube.

He said: "The bottom line is there are no known mechanisms by which mobile phone radiation can increase the risk of cancer."

Hyland disagrees. He points out that mobile phone radiation has been found to affect a wide variety of brain functions - such as electrical activity (*EEG*) electrochemistry and the permeability of the blood/brain barrier - and to undermine the immune system.

Although the precise mechanisms are unclear, Hyland pointed to an "undeniable consistency between some of these non-thermal influences and the nature of many of the health problems reported", such as headache, sleep disruption, impairment of short term memory, increases in the frequency of seizures in some epileptic children when exposed to Base-station radiation, and of brain tumours amongst users of mobile phones.

Thus, reports of headache are consistent with the effect observed on the dopamine-opiate system of the brain, and the increase in permeability of the blood-brain barrier, both of which have been medically connected with headache. The reports of sleep disruption are consistent with the observed effect of the radiation on rapid eye movement (REM) sleep and on melatonin levels; whilst memory impairment is consistent with the finding that microwave radiation targets the hippocampus. Epileptic seizures are known to be induced by visible light flashing at a certain low frequency, and there is no reason to suppose that microwave radiation, which can access the brain directly through the skull, flashing at a similar frequency, cannot cause the effect. Indeed, exposure to such microwave radiation is known to induce epileptic activity in certain animals; and there have been reports of increased seizures in some children suffering from epilepsy that were exposed to base-station radiation.

Finally, mobile phone users show statistically significant increase (by a factor of between 2 and 3) in the incidence of a rather rare kind of tumour (epithelial neuroma) on the side of the brain nearest the mobile phone.

What then is the appropriate exposure limit? Hyland points out that some experiments are indicating non-thermal thresholds for biological effects of the order of microwatt/cm<sup>2</sup>. Adverse effects have been reported,

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### **EM Radiation is Harmful**

however, at power densities a few tenths of that value at distances of 150-200m from a typical 15m high Base-station mast and within the range of the more localised side-lobes in the immediate vicinity of a mast. Incorporating a further safety factor of 10 to allow for the possibility of long-term exposure, the power densities should not exceed 10 nanoW (billionth of a Watt)/cm<sup>2</sup>.

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## EM Radiation is Harmful

### Appendix 14

#### Electromagnetic Fields Double Leukemia Risks

*After years of controversy, a new study confirms that exposure to electromagnetic fields doubles leukaemia risks. Dr. Mae-Wan Ho reports.*

The radiation emitted by power cables, pylons and electrical appliances in the home may be causing cancer in two children in Britain every year, according to new epidemiological evidence.

The study, commissioned by the National Radiological Protection Board (NRPB) concluded that one in 200 British children are exposed to high levels of electromagnetic radiation in the home and that this could be doubling their risk of leukaemia.

Dispute over the possible links between electromagnetic fields and cancer goes back to the 1970s in the United States and before. A series of laboratory and epidemiological investigations worldwide came up with contradictory and inconclusive findings.

But the argument has dramatically shifted in favour of there being a causal link with the publication in March 2002 of the long-awaited report by a team of scientists headed by Richard Doll of the Cancer Studies Unit at Oxford. Doll is renowned for his role in proving that smoking is the principal cause of lung cancer.

The danger occurs with exposures to electromagnetic fields of 0.4 microTeslas (or 4 milliGauss) and greater, levels that the NRPB says one in 200 children in Britain - and many abroad - receive in their houses.

For comparison, the earth's magnetic field is about 50 microTeslas. The earth's field, which includes other natural frequencies, has been with us since life began. And many organisms are adapted to it. Birds, for example, use the earth's magnetic field to navigate long distances in their annual migration.

Since the discovery of electricity and the invention of radar in the 1930s, human beings have been saturating our everyday environment with a spectrum of artificial electromagnetic radiations (see Box 1), the harmful effects of which have become increasingly apparent.

The report reveals for the first time that less than half of the exposures are due to nearby high-voltage power lines and electricity sub-stations. The remainder are probably from a combination of wiring, computers, televisions and other electrical equipment, but needs further research.

The effect is too small to have been detected in the UK Childhood Cancer Study conducted in 1999.

However it was spotted in a pooled analysis of 3,247 cases of childhood leukemia in Europe, North America and New Zealand published last year.

The report stops short of drawing any firm conclusions because of the absence of any proven biological mechanisms by which such low levels of non-ionising electromagnetic radiation can trigger cancer.

Source: "Electrical connection" by Rob Edwards and Duncan Graham-Rowe. *New Scientist* 6 March 2002.

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## EM Radiation is Harmful

### Box 1

#### **Electromagnetic waves and the electromagnetic spectrum**

Electromagnetic waves propagate through empty space at the speed of light, ie, 300 000 kilometres per second, and include the light that enables us to see, which vibrate at frequencies of about  $10^{14}$  cycles per second. They have both an electrical component and a magnetic component vibrating at right angles to each another.

The entire electromagnetic spectrum is extremely wide, ranging from waves that vibrate at less than one cycle per second, or one Hz (Hertz) - named after Heinrich Hertz, the German physicist who discovered electromagnetic waves in 1888 - to  $10^{24}$  Hz. The corresponding range of wavelengths - speed/frequency - is from  $3 \times 10^8$  metres to  $3 \times 10^{-15}$  metre.

Above the visible spectrum are the ultraviolet rays, X-rays and g-rays, the 'ionising' radiations that break molecules up into electrically charged entities, and can damage DNA, causing harmful mutations.

Below the visible spectrum, are the 'non-ionising electromagnetic radiation' (NIEMR), emitted by electrical power stations, transmission lines, radio and TV towers, mobile phone base-stations, microwave ovens, radar, electric blankets, radios, TVs, computers, mobile phones, and other electrical appliances.

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## EM Radiation is Harmful

### Appendix 15

#### Instrumentation

The SE-5 *plus* Intrinsic Data Field Analyser, is a solid state electronic instrument, designed to detect and quantify a full spectrum of signals and wave form patterns within the human biofield. All matter, through radiation, emits energy sources at predictable levels. The instrument assists the operator in establishing through electronic means a measure of the resonance and imbalances at these specific levels. The SE5 functions also as a receiver and modulator of wave form information found in electromagnetic and gravitational energy fields and is grounded in the concepts of Advanced Quantum Mechanics. The device is well equipped to analyse the subtle out-of-phase relationships that radiation imposes on the human body.

The SE5-plus Intrinsic Data Field Analyzer can be explained in simple terms through the known laws of physics.

- 1) Everything that exists is fundamentally an energy field, which contains vibrational information about the contents of that field.
- 2) The interchange of matter and energy in a subtle informational field can be measured in terms of waveform and amplitude.
- 3) The content of a wave field is based on its amplitude, wavelength and energy.
- 4) Every substance has a resonance which will provide increased energy proportional to it being stimulated at its resonant energy or conversely less energy when stimulated with energy opposite its resonant point of vibration.

#### Reading the Data

There are only three readings to take into account.

- 1) Reading with no device to influence the human body.
- 2) Reading with a device which causes a negative influence to the human body.
- 3) Reading with a device and Shield attached, showing the beneficial effect to the human body.

There are two separate readings, a positive reading and a negative reading. The positive reading is taken from 100 to 0. The higher the amplitude reading the greater is the beneficial effects to the human system.

The negative reading is taken from 0 to 100. The lower the amplitude reading the greater is the beneficial effects on the human body.

#### The Device

The "Therapeutic Device", In its construction the use of microcrystal technology in proprietary preparation enables devices to be built which react to scalar resonance and human intent, which control and generate negation patterns for potentially harmful "deltas" or changes that occur in the human body. The microcrystal device can be viewed also, as a scalar electromagnetic generator, designed to correct or smooth the adverse effects caused by electromagnetic radiation fields on the human body.

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## EM Radiation is Harmful

### Quantum Energy

To create the essential patterns to make this device work it requires impute from two fields.

- 1) Scalar field. Where each point within space is assigned a magnitude, the set of spatial points and there as signed magnitudes is called a scalar field. In this new approach, an observable scalar value is assigned to every point in
- 2) n-dimensional space, where n is 4 or greater.

### Scalar resonance.

In its simplest structure, scalar resonance can be seen as two ordinary single frequency EM waves, with each wave coupled exactly 180 degrees out of phase, so that their E fields sum to zero and the B fields likewise sum to zero. This then becomes a true scalar wave, and its cavity is said to be in scalar resonance.

### Conclusions

With the advent of quantum mechanics a new and useful tool is emerging, as research looks into the nature of creative and destructive forces which produce matter. Some fifteen years ago most of the electromagnetic spectrum was empty, today with more sophisticated instrumentation, it shows that it is practically full. Science is finding that it is not the high voltage high intensity energies which are causing the most concern, but the lower more subtle energy patterns which are more attuned to the human bodies cellular communication s network that are being disrupted.

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## EM Radiation is Harmful

### Appendix 16

#### Operation of the Therapeutic Device Crystal Resonator

This information represents some twenty years research and development into very fine subtle energy fields and their management, balancing, and tuning within the Therapeutic Device.

Understanding the nature of pulsatory energy helps to establish new views on the quantum effects caused by contributors to electrical smog components, i.e. mobile phone radiation and computer radiation which violate human energy fields causing sickness or at least an 'unwell' feeling.

These appliances which have become an integral part of modern life saturate everyone with electromagnetic radiation from hundreds of sources. All day people use devices that are conductors of life energy, and people wonder why at the end of it they feel drained. This situation has developed into a menace within society today and is not going to get any better.

There is increasing evidence that people and animals generate a slight electric and biomagnetic field. It can now be said that other electromagnetic influences, coming from the earth and from space, play an important role in maintaining our well-being. Recent scientific understanding demonstrates how a disturbance of our body's natural force fields can adversely affect its overall health.

#### **Why have a Therapeutic device?**

The purpose of the Therapeutic Device is to maintain vortex polarity balance of the body energy fields and negate the harmful electrical and magnetic radiation produced by cellular phones and computers.

The Device has been designed to give protection from these daily effects and from the destructive electrical pollution and magnetic forces which alter the human polarity. Altered body polarity will cause problems such as tension, short term memory loss, frustration, headaches, dizziness, fatigue, concentration loss, apprehension and pain etc.

#### **What is a Therapeutic Device?**

The Therapeutic Device is a passive device, it does not require a battery or any other electrical source for its operation; It alters the mobile phone's radiation field in a unique way so as to strengthen the electron/photon entanglement within the body's bio-gravitational field.

The Therapeutic Device microcrystals are not just quartz crystals as most people would think. It contains many kinds of crystals. The ones inside the Device comprise an energy cell with a multitude of quasi electronic tank circuits acting as traps and wave filters of various frequencies of each vortex energy system. The Therapeutic Device microcrystals are very sensitive and responsive to a wide range of frequencies within the environmental electric and magnetic fields.

The device consists of thousands of specially designed and processed microcrystals. Each of these crystals has the ability to store energy and to discharge energy at specific frequencies. The mobile phone's pulsating electromagnetic waves tend to make the "therapeutic device" crystals self organise in a series parallel grid patterns making the mobile phone radiation bio compatible with the human system.

#### **Solution to the Electro-Magnetic Pollution Problem.**

Since all electromagnetic "smog" affects all biological energy systems by disorientating their natural vortex polarities, the quest for a solution led to the development of a special device called the Therapeutic Device. This device has been engineered to protect each of the bio-energy fields from being influenced and entrained by environmental electromagnetic fields.

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## **EM Radiation is Harmful**

The Therapeutic Device is active on the interface between the subtle energies and physical composition of matter. The device functions as a vortex polarity balancer and aura amplifier (transducer). It ensures a constant protection to the life force (subtle energy) to all parts of the biological and biophysical human system. The Therapeutic Device is a powerful and adaptable item for many radiation problems, and is a very effective shield against subtle energy wave interference caused by electronic "smog" (none bio-compatible electrical fields and magnetic forces that disrupt the human body).

### **It is available NOW**

Until recently it has been difficult provide protection from the bombardment of electrical and magnetic radiation. Now, however, such protection is obtainable from this device. The Therapeutic Device has been designed to afford protection from the daily effects of destructive electrical and magnetic forces, which alter human body polarity.

The Therapeutic Device is a small microcrystalline composition, sensitive to certain energy waves in the electromagnetic spectrum. It is neatly contained and sealed in a small plastic unit, it creates a protective force shield, removing the charge from the electron/photon (small particles of energy) and so effectively stopping the electron/photon particles from disentangling. As a result no detrimental effects are placed upon the biophysical energy systems within the human body.

### **How using a (unprotected) mobile phone may affect you (the list below are rated medium to high risk)**

- Memory Loss
- Ear problems
- Fatigue
- Tingling/Tightness
- Concentration Loss
- Burning Skin " biological effects of
- Dizziness
- Headaches
- Warmth behind Ear
- Thoughts are cloudy
- Disturbed vision
- Decision Making disturbed

### **Method of Operation**

The device is attached to the mobile phone or computer keyboard.

By placing the "Therapeutic Device" close or within the fields generated by these devices, it causes an interaction to take place; this has the affect of countering the negative effect of electromagnetic radiation fields.