

## CELLULAR AND HORMONAL CHANGES

**This category is important because it is precursor to many diseases, with serious potential to reduce well being and degrade physical, psychological health.** Involves an array of biological and chemical elements and processes. It is very complex, broad and functions are interrelated.

Thousands 1000s of research studies completed in this area in last 50 years. For the most comprehensive listing and analysis in this category see

[www.bioinitiative.org](http://www.bioinitiative.org), also good source [www.EHTrust.org/science/](http://www.EHTrust.org/science/)

To name a few Key Critical Cellular & Hormonal Issues

Gene Toxicity & mutation, DNA Damage, Melatonin decrease, Oxidative stress, surge Reactive Oxygen Species, mitochondria changes, Protein & Molecular damage & deregulation, Antioxidant suppression, Calcium Ion imbalances, micronuclei increase, Nitric Oxide changes, Blood cell damage, Cortisol activation, Heat shock protein activation, T3 thyroid changes.

### FIELD EXPOSURES - Uncontrolled Environments

#### Cell Tower ; Cell Phone

Young adult volunteers show [reductions in hormonal levels and plasma proteins](#) : ACTH, serum cortisol, female prolactin levels, thyroid hormones especially T3 and testosterone in males due to long term exposure to RF from cell towers, antennas & phones.

***How does long term exposure to base stations and mobile phones affect human hormone profiles?*** Clinical Biochemistry, Volume 45, Issues 1–2, **January 2012**, Pages 157-161, Emad F. Eskander, Selim F. Estefan, Ahmed A. Abd-Rabou **Egypt 2012**

Study Found 6 months after activation of neighboring cell tower stress related hormones/neurotransmitter was significantly elevated thru [increase stress hormones Adrenaline, noradrenaline and significant reduction in mood enhancing neurotransmitters dopamine](#), and phenylethylamine (PEA). This condition more pronounced in sick, elderly and young children. Condition continued 1 ½ after installation.

***Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields—A Long-term Study under Real-life Conditions;***  
Dr. Klaus Buchner and Dr. Horst Eger; Elektromagnetische Felder in der Medizin - Diagnostik, Therapie, Umwelt'; (Code-Nr. 65143 KV Bayern) **Germany, 2011**

### LAB EXPOSURES - Controlled Environments

## Cell Phone

RF radiation induces [negative micronuclei](#) in specific blood cell lines but not others. Possible adverse health effect: *Cancer & immune dysfunction*;

***Radiofrequency electromagnetic fields (UMTS, 1,950 MHz) induce genotoxic effects in vitro in human fibroblasts but not in lymphocytes***; Schwarz C, Kratochvil E, Pilger A, Kuster N, et al.; Source: Division of Occupational Medicine, Medical University of Vienna

**Austria, 2008**

Study showed [13 proteins in the Brain effected](#) by exposure to direct exposure to RF/Microwave radiation, specifically Cordless phones. Study states proteins effected can have correlation to [headaches, sleep disturbance, fatigue, memory deficits, and brain tumor long-term induction](#).

***Brain proteome response following whole body exposure of mice to mobile phone or wireless DECT base radiation***. Adamantia F. Fragopoulou, George Th.

Tsangaris, Lukas H. Margaritis; Electromagnetic Biology and Medicine

**Greece, 2012**

TAGS: Brain;

Rabbits moderately exposed showed enzymes governing respiration (succinate dehydrogenase - SD) & glycolysis (lactate dehydrogenase) were significantly activated & deactivated, respectively. Implied the body had [insufficient time for rest and repair thru process of glycolysis](#). SD is powerful energy-supply enzyme in mitochondria which in turn effects respiration.

***The effect of cell-phone radiation on rabbits: Lymphocyte enzyme-activity data***; M. V. Zakharchenko, A. V. Kovzan, N. V. Khunderyakova, T. V. Yachkula, O. V. Krukova, R. G. et al; Biophysics. 61(1):100-104.

**Russia, 2016**

3G mobile phone significantly activated [cellular stress response thru cellular signal transduction pathways, inducing DNA strand breaks](#) in brain, significant increase in micronuclei. Activation of: heat shock proteins (hsp27, hsp70), mitochondria dysfunction mediator cytochrome c release and subsequent activation of caspases involved in the process of radiation-induced apoptotic cell death

***Effect of 3G cell phone exposure with computer controlled 2-D stepper motor on non-thermal activation of the hsp27/p38MAPK stress pathway in rat brain***;

Kesari KK, Meena R, Nirala J, Kumar J, Verma HN; Cell Biochem Biophys 68(2):347-358, 2014

**India, 2014**

TAGS: Brain;

## RF Transmitter

Variations in the levels of [Stress metabolizing proteins and enzymes](#) were observed in 3 groups of Humans subjects exposed to changing intensity levels of cell tower radiation. Pronounced jump in Cortisol was found in group experiencing high exposure after a prolonged period of low cell tower exposure. Possible adverse health effects: *Diabetes, Kidney & cardiovascular disorders*

**'Effects of exposure to GSM mobile phone base station signals on salivary cortisol, alpha-amylase, and immunoglobulin A'**; Augner C, Hacker GW, Oberfeld G, et al.; Source IGGMB-Research Institute for Frontier Questions of Medicine and Biotechnology, Salzburg Federal Hospital-University Clinics of the Paracelsus Medical Private University  
**Austria, 2010**

Rats RF exposed showed [stimulation to ROS \(Reactive Oxygen Species\)](#) indicating oxidative stress and depression of various Thyroid hormones induced at RF levels mostly below safety guidelines. Protection afforded by Vit C & E antioxidants.

Possible adverse health effects: *Diabetes; Thyroid, Reproductive and Cardiovascular disorders.*

**900 MHz radiofrequency-induced histopathologic changes and oxidative stress in rat endometrium: protection by vitamins E and C**; Guney M, Ozguner F, et al.; Department of Obstetrics and Gynecology, Faculty of Medicine, Suleyman Demirel University; 2007

[Effects of 900 MHz electromagnetic field on TSH and thyroid hormones in rats.](#); Koyu A, Cesur G, et al.; Source Department of Physiology, Suleyman Demirel University, School of Medicine;; **Turkey 2005 & 2007**

[Rise in Micronuclei in fetal rat](#) .

Possible adverse health effect: *Cancer and Immune dysfunction*

**'Ultra high frequency-electromagnetic field irradiation during pregnancy leads to an increase in erythrocytes micronuclei incidence in rat offspring'**; Ferreira AR, Knakievicz T, et al.; Source Centro de Estudos em Estresse Oxidativo, Departamento de Bioquímica, ICBS, Universidade Federal do Rio Grande do Sul, Porto Alegre;  
**Brazil 2006.**

RF disturbs calcium ion exchange process, [activation of cyclic GMP & Nitric Oxide](#) (NO) . Authors suggest that radio frequency activates NO synthase to induce vasodilatation.

Possible adverse health effect: *Diabetes, Cardiovascular disorders, Neurological & Learning*

**10 MHz (PW/burst) exposure any analysis of vasodilation in tissues and tissue homogenates'**;

Principal Investigator Gunma University School of Medicine, Maebashi-shi  
**Japan 2009**

RF radiation induces [negative micronuclei](#) in specific blood cell lines but not others. Possible adverse health effect: *Cancer & immune dysfunction* ;

**'Radiofrequency electromagnetic fields (UMTS, 1,950 MHz) induce genotoxic effects in vitro in human fibroblasts but not in lymphocytes'**; Schwarz C, Kratochvil E, Pilger A, Kuster N, et al.; Source Division of Occupational Medicine, Medical University of Vienna,

## **Austria 2008**

Rats exposed to simulated pulse modulated 2G phone showed significant levels of oxidative stress & tissue toxicity by release of [reactive oxygen species thru lipid peroxidation shown in the elevated levels of MDA\(malondialdehyde\) & Nitric Oxide\(NOx\)](#) and decrease in protective antioxidant Glutathione (GSH)

***900 MHz pulse-modulated radiofrequency radiation induces oxidative stress on heart, lung, testis and liver tissues***; Esmekaya MA, Ozer C, Seyhan N; Gen Physiol Biophys. 2011 Mar;30(1):84-9  
**Turkey, 2011**