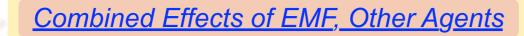
IF ONE HIT \* IS FREE-RADICAL PRODUCTION, DNA STRAND BREAKAGE, CALCIUM EFFLUX, ETC., FROM EMF, DO WE BECOME **MORE VULNERABLE TO SERIOUS** PATHOLOGY? CAN EMF CREATE **MORE THAN ONE HIT AT A TIME?** 

## **EXAMPLES OF EMF COMBINATION HITS:**

Oxidative stress plus reduced melatonin Oxidative stress plus aberrant signaling Oxidative stress from direct plus indirect effects DNA strand breaks plus poor DNA repair Calcium efflux plus reduced DNA repair Membrane damage plus reduced DNA repair EEG changes plus blood brain barrier permeability Interfacial water resonance plus membrane damage Reduced melatonin plus glutathione depletion and many more...



Video: Dr. Blackman on Nonlinearity



Interactions May Matter Most



It Takes Two to Tango

Two Hits and You're Out? AD Information

**EMF Sensitivity and Vulnerability** 



Combined effects EMF and other agents



Two-Hit Hypothesis and Organ Dysfunction

Study: One RF exposure with two mechanisms

Solving complex causes of multiple-hit disorders

**Related Maps** 

Melatonin

SIGNIFICANT HITS:

DNA/RNA

**Nonlinearity** 

**DNA effects** Free radical formation Calcium efflux Oscillatory disruption

Free Radicals

Calcium Efflux

Cellular Triage

**Interfacial Water** 

**Bio-Effects Overview** 

Lifetime Accumulation

**Membrane Oscillations** 

**Proposed Mechanisms** 

Electro-Hypersensitivity

**EMF Interactions With Toxins** 

Methylation/Glutathione, EMF

CONTEMPORARY

MULTIPLE HIT MODEL

**Examples** Multiple Hit Models

Home: Oscillatorium



Newest version this map Date of this update: 03-27-16

Neurodevelopmental vulnerabilities Aging with functional declines Ambient toxic exposures with bioeffects

History of illness with residual vulnerabilities History of injuries with residual vulnerabilities Pharmaceutical intake with altered physiology **lonizing radiation exposure with tissue damage** Nutritional depletion with vulnerabilities Stresses of many kinds with vulnerabilities

**EXAMPLES OF UBIQUITOUS NON-EMF HITS:** 



A single EMF exposure produces different "hits", depending on how the radiation scatters and which tissues are affected. Study on Nonlinearity

## EMF CONFOUNDS EFFECTS OF OTHER EXPOSURES

"... we believe that synergistic investigations deserve special attention. Indeed, people are exposed to many different influences, and theoretically it may well be that a RF-exposure alone is ineffective whereas this exposure might enhance the mutagenicity, carcinogenicity or teratogenicity of chemical or physical factors." EMF Synergy Paper \* Hit in this discussion an adverse physiological effect from any cause (in this case EMF exposure). In some medical literature, hit refers specifically to genetic mutations or variations, but it may also have the broader meaning of negative effect.

## MULTIPLE HITS VIA NEURAL DISRUPTION?

"Synchronous biological oscillations in cells (pacemaker cells) can be disrupted by artificial, exogenous environmental signals, resulting in desynchronization of neural activity that regulates critical functions (including metabolism) in the brain, gut and heart and circadian rhythms governing sleep and hormone cycles (Strogatz, 1987)." **BioInitiative 2012** 

