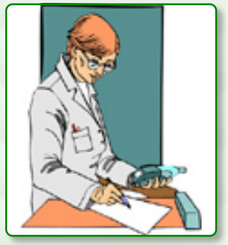
Hormesis and EMF: A Complex Dose-Response Phenomenon

For radiation and many (perhaps most) exogenous substances, our bodies respond differently to small doses than large doses; some researchers -- but not all -- say the small and large dose effects are opposite.

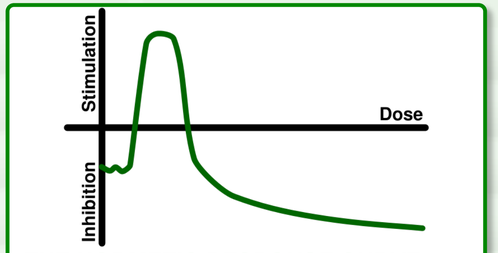
This is particularly significant because so much attention has been given to reports which state that cell phone radiation is neuroprotective when so many studies find otherwise. Perhaps the science is poor, or the selection of subjects or interpretation of data is biased due to industry funding or politics.

This map offers explanations, quotes and links that help us to understand one physiological reason why, under some conditions, a small dose can stimulate certain repair mechanisms -- that is, if the tissues are not too deficient, too damaged, or responding to other stresses.



Radiation hormesis traditionally refers to ionizing radiation. However, many of the bio-effects of non-ionizing radiation are the same. Also, the phenomenon of hormesis has been shown to exist in the study of potentially toxic substances as well as techniques of physical medicine.

Radiation Hormesis PPT



THE HORMETIC RESPONSE CURVE

A little might be interpreted as beneficial. More may be interpreted as harmful.

SOME KEY ELEMENTS OF THE HORMETIC MODEL

Small doses may produce large responses.

Large doses may produce opposite responses to small doses.

Small doses and higher doses may have different effects, both adverse.

Judgments about adversity of effects are separate from the hormetic response, which is fact.

Dose alone does not predict response; state of organism is a factor.

Video: Jerry Phillips discusses hormesis in a presentation on DNA damage from EMF

Cindy Sage: Similarities, Ionizing and Non-Ionizing EMF effects, low doses

Effect of cell phones: High or low dosage? Protective or harmful?

- "No convincing evidence"
- Don't use them prophylactically
- Wall St. Journal on Interphone study
- CHE-EMF working group press release
- Large analysis on effects of cell phones
- Study that says low dosage protects the brain

Related Maps

- Toxins
- Triage
- Nonlinearity
- Mechanisms
- Therapeutic EMF

EMF: When Beneficial, When Dangerous

RADIATION HORMESIS ***(Luckey, Calabrese)***

Stimulation of DNA, RNA, protein synthesis

DNA repair activity

Increase in cellular antioxidant capacity

Prolongation of life span

Activation of immune function

What is hormesis?

- Radiation hormesis
- How certain stresses can be good
- Hormetic vs threshold dose-response

A DISAGREEMENT... (SOME ADVERSE EFFECTS MISSED)

Articles

- Dose-response society
- Hormesis and Medicine
- Understanding Hormesis
- Myths and misconceptions
- Nutrition and the dose-response
- Non-linearity and dose-response
- Hormesis: dose-response revolution
- Letter: The Toxicology Model for EMF?

Studies

- The Hormesis Paradigm
- Toxicology, risk assessment
- Threshold model never proved
- Credible dose-response model
- Caloric restriction and hormesis
- Hormesis and dietary antioxidants
- Neurons, stress responses, hormesis
- No clear dose-response in tumor studies
- A revolution in toxicology, risk assessment
- Low-dose responses, hormetic more than threshold
- Hormesis "outcompetes" other models in toxicology

Home: Oscillatorium
Newest version this map
Date of this update: 11-26-15

"... ignoring hormesis is poor policy because it ignores knowledge that could be used to improve public health... "

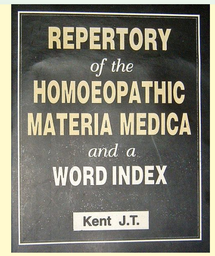
E.J. Calabrese

"... living cells and organisms perceive the damaging effects of the radiation and put themselves into "repair mode". This includes boosting enzymes needed for cellular growth and regeneration and also triggering inflammation to increase the blood supply to the affected region. Provided these measures are successful, there may be no observable adverse effects."

Andrew Goldsworthy

"The definition of hormesis that I use is adaptive, non-monotonic, biphasic, dose-response relations characterized by small quantities having opposite effects from large quantities; that is, small doses elicit opposite responses to those of high doses. Note that this definition deliberately avoids the potentially vexing issue of beneficial versus harmful effects, which requires a more detailed evaluation of the biological and ecological response content."

Daniel Hays



Because of the long-standing antipathy of medicine toward homeopathy, hormesis was not accepted -- even though it is a stronger dose-response model than that of threshold.