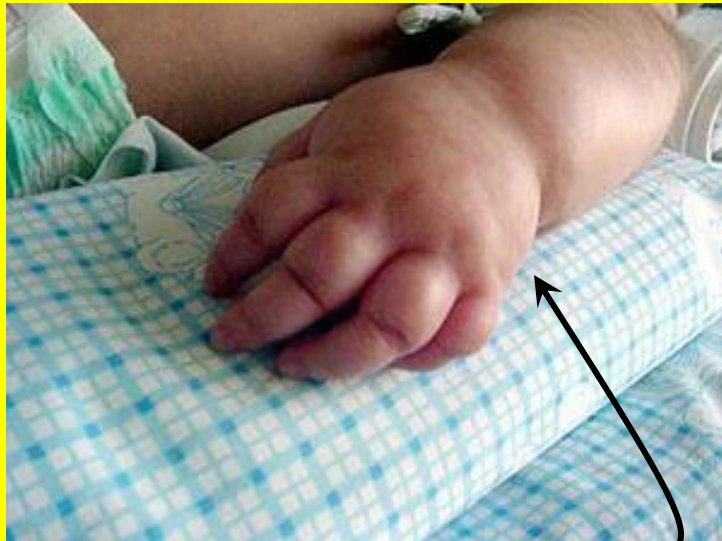


**Edema and its Reduction:
A Therapeutic
Electromagnetic Link?**

**Dr. Harvey N. Mayrovitz
Professor of Physiology**

What is Edema?

What is Edema? → Excess Interstitial Fluid



Lymphedema → High Protein Content

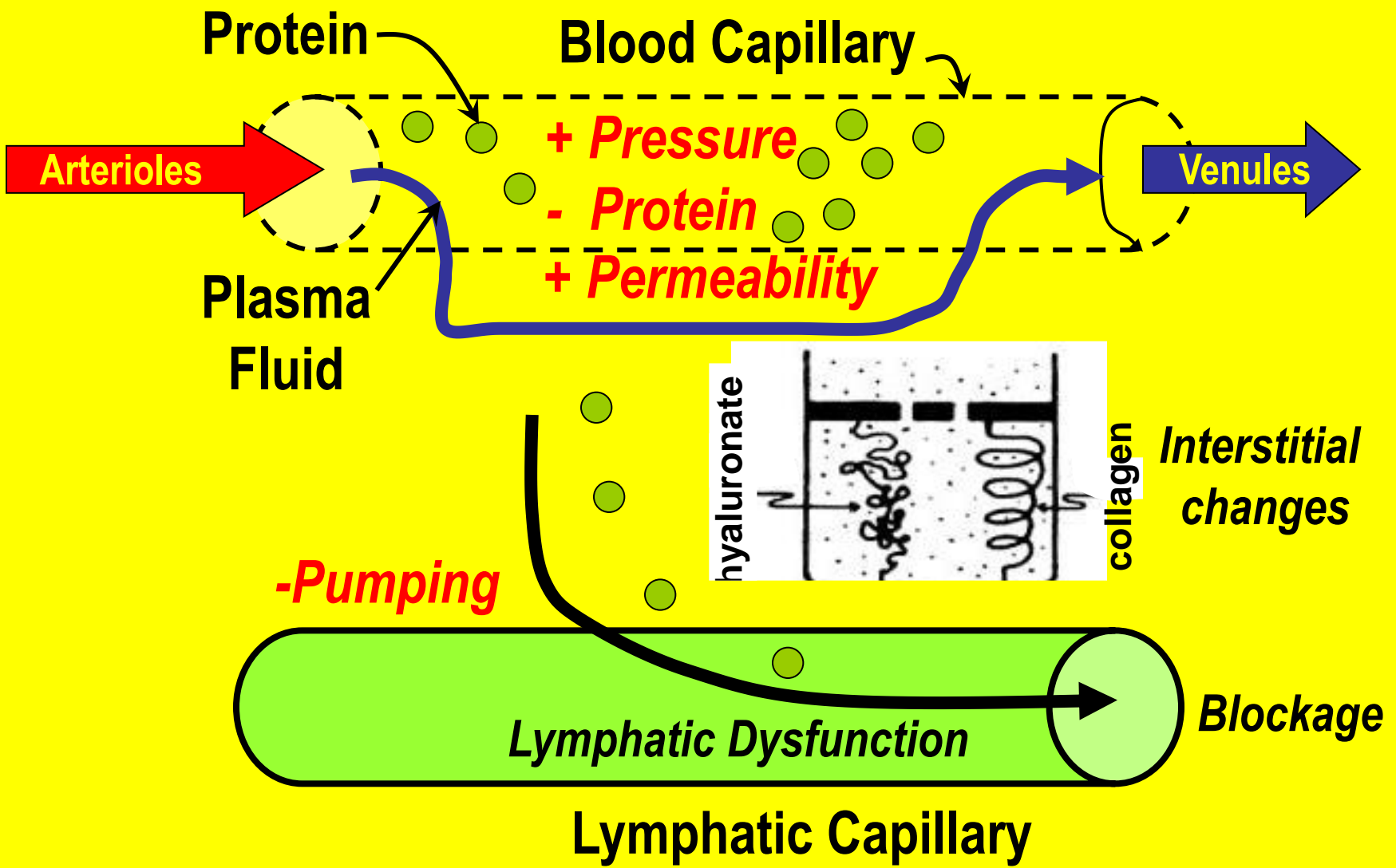
What are Underlying Causes of Edema?

More Fluid is Filtered than can be Removed!

Pressure – Protein – Permeability - Pumping

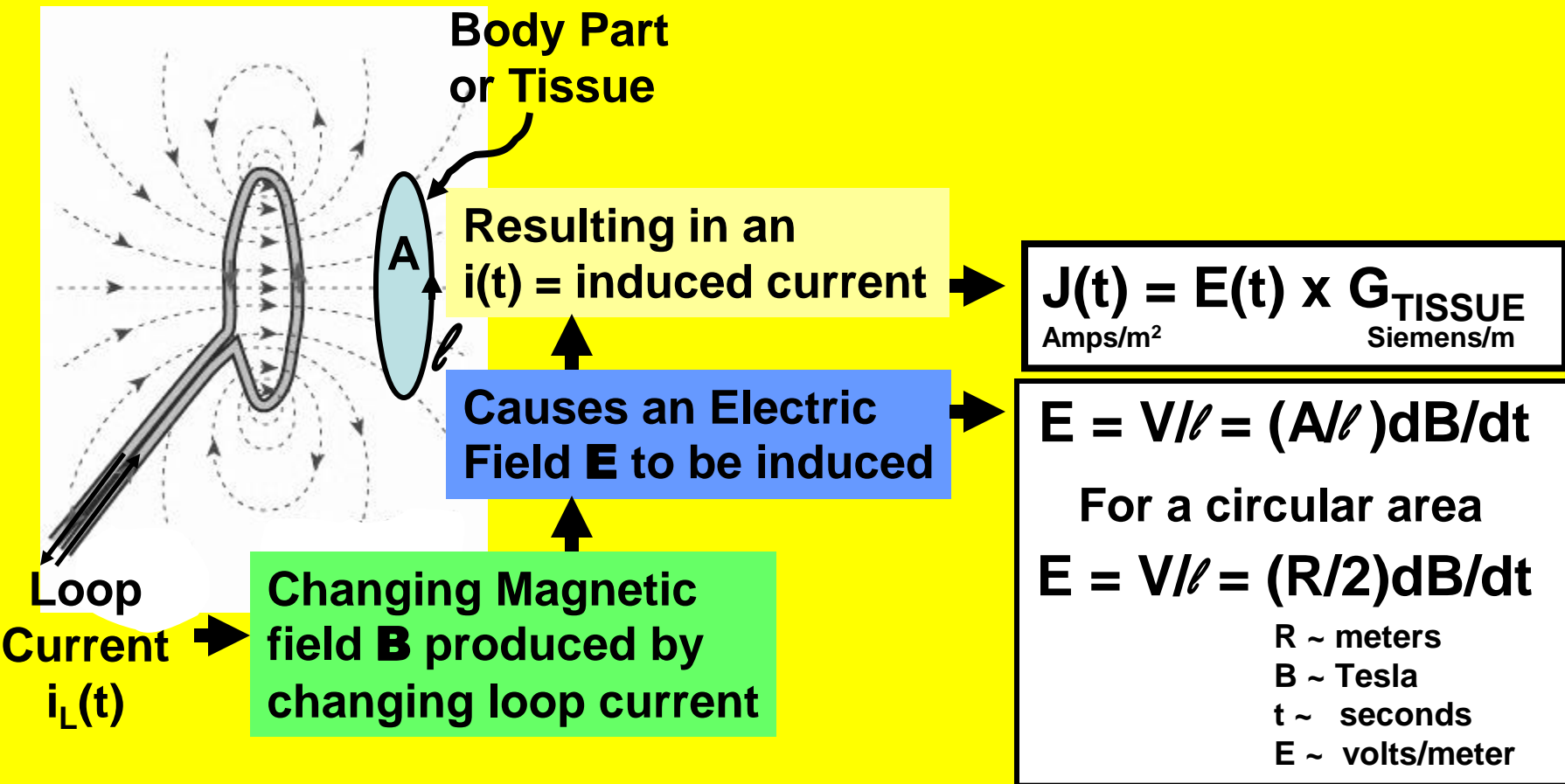
More Fluid is Filtered than can be Removed!

Pressure – Protein – Permeability - Pumping



**What is Electromagnetism?
How might it fit in?**

Electromagnetic Fields (EMF) and Induction: Basic Considerations



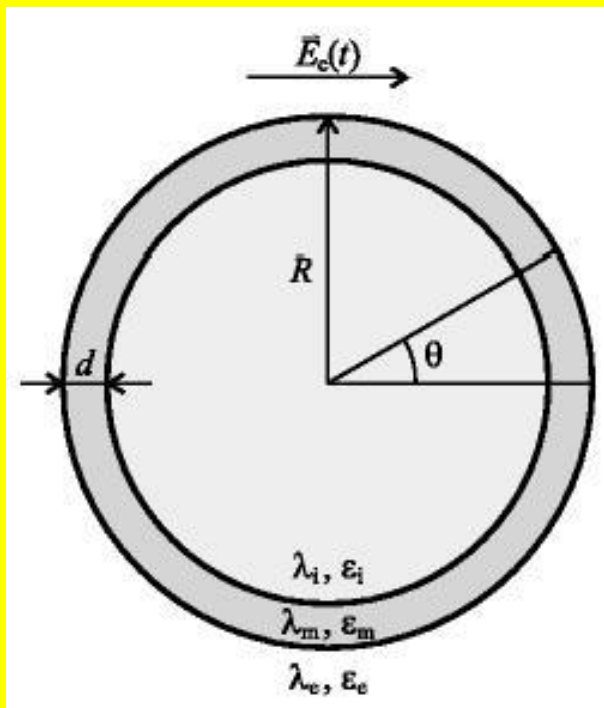
How Might Electromagnetism Fit In?

Short answer

Almost all aspects of all bodily functions
have an electrical component

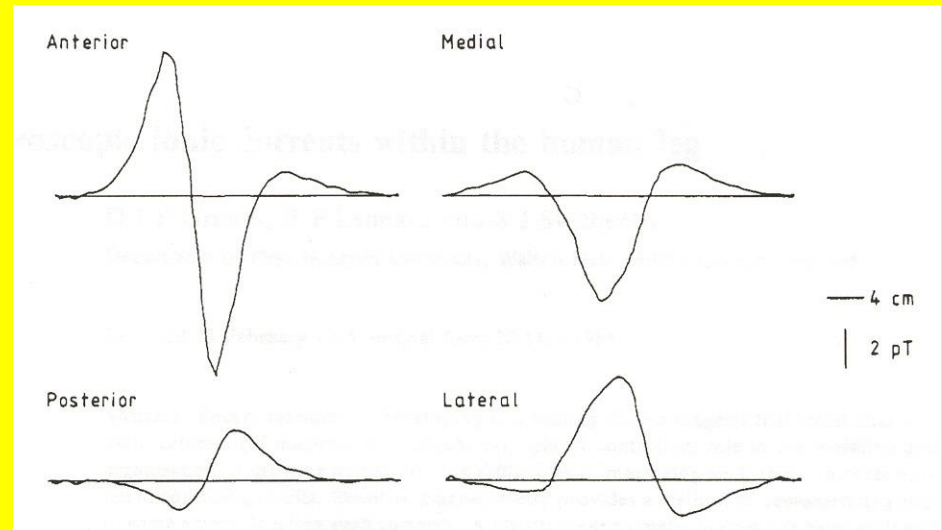
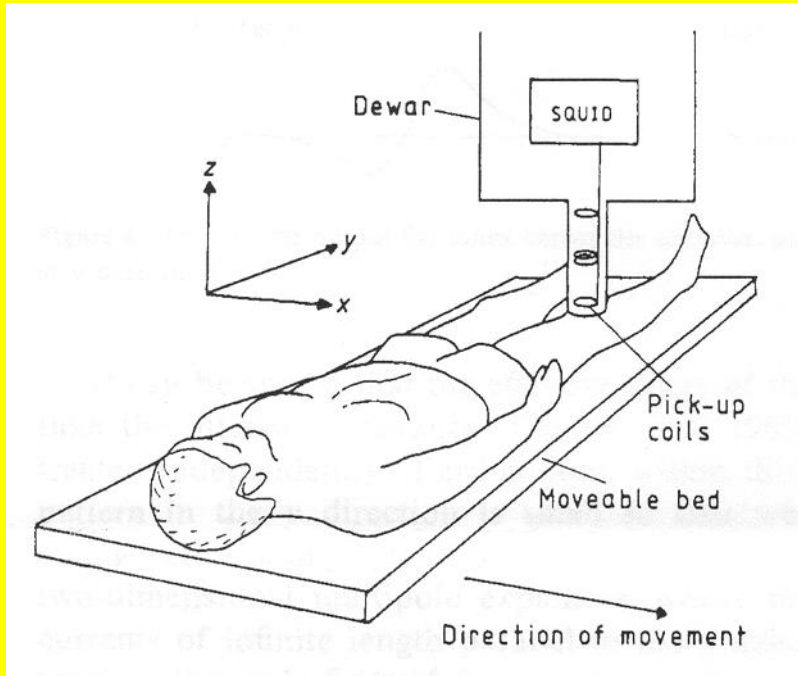
Induced Current
Induced E Field
Resonance Phenomena
Information Coupling

Thus there are ample *potential*
targets for applied EMF



Examples of Electric Features

Macroscopic ionic currents are present in normal tissue

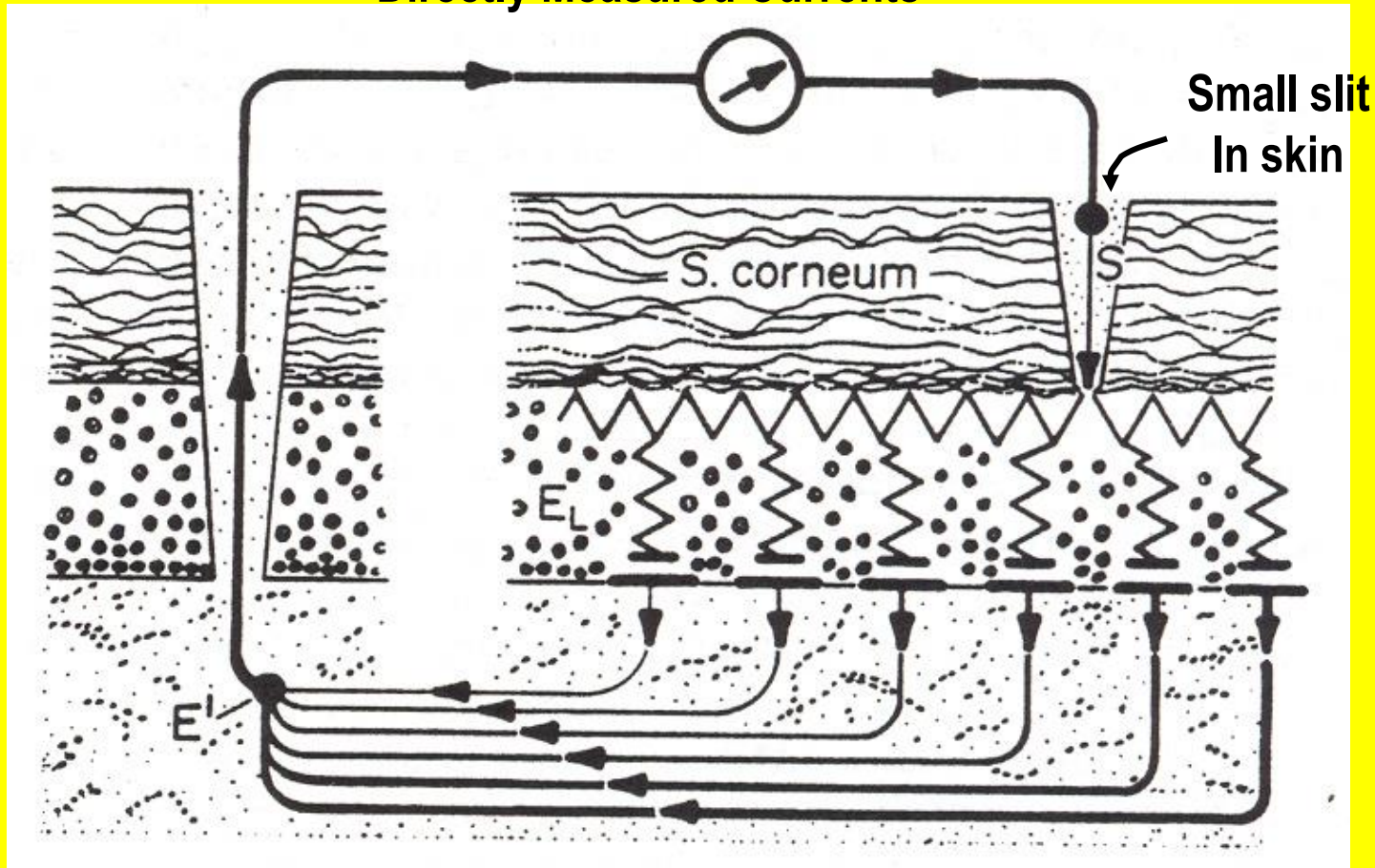


External Fields Might Interact with these Macroscopic Currents

Earth field ~ 0.5 Gauss = 0.5×10^{-4} Tesla

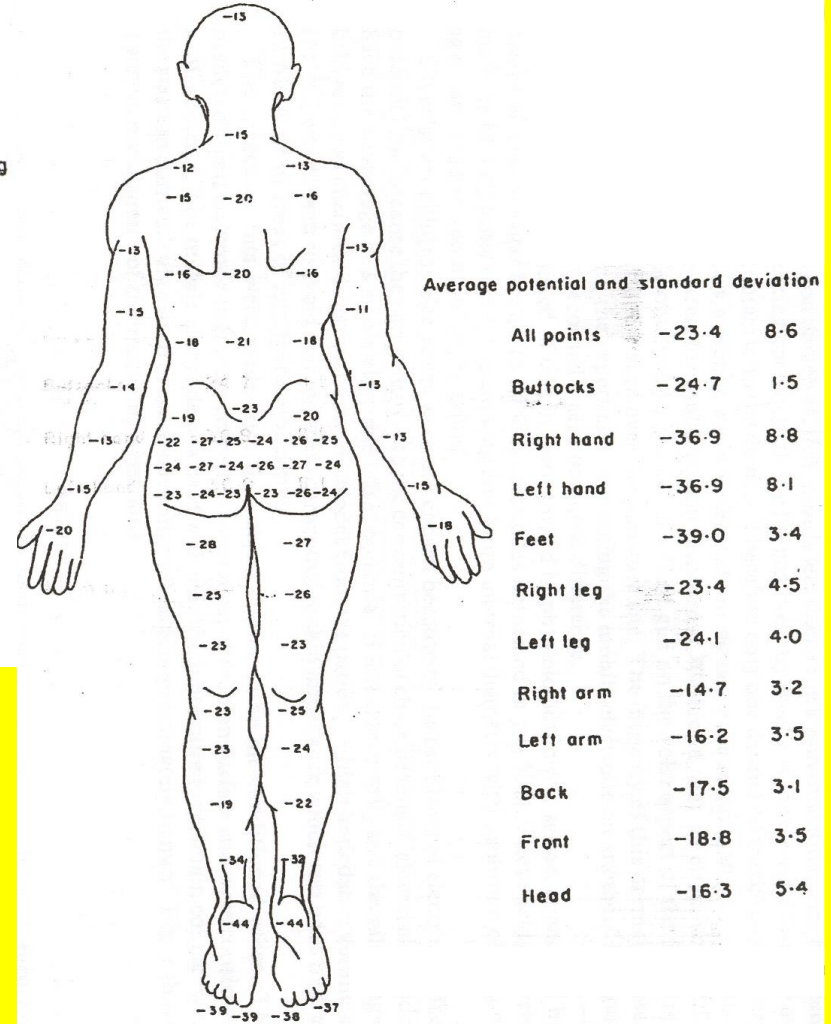
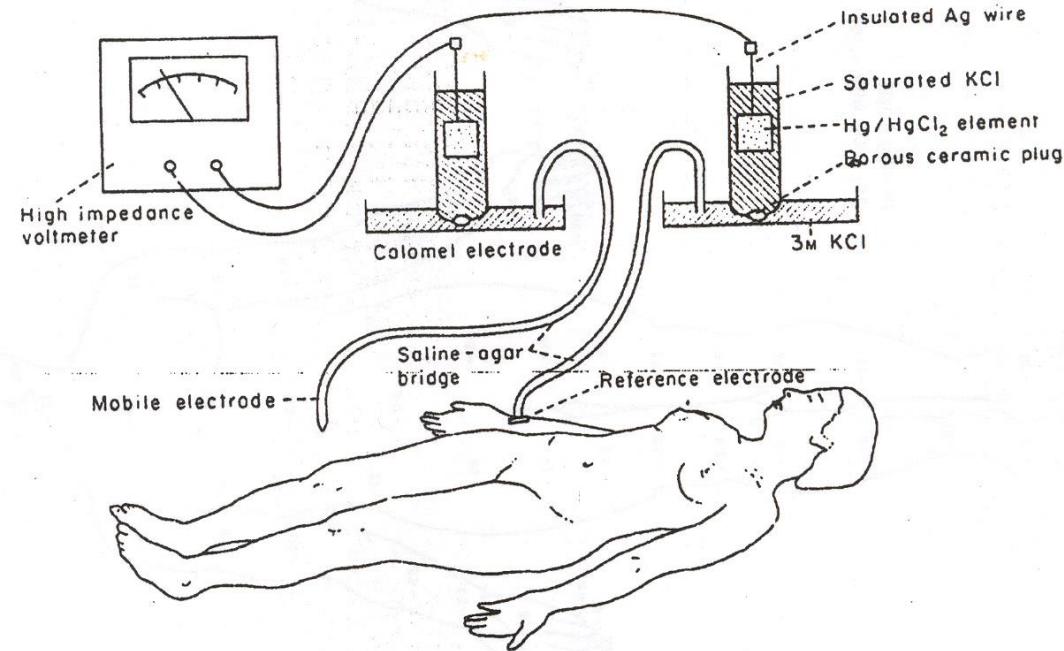
Human Skin is like a Battery

Directly Measured Currents



Field-Induced Currents Might Interact with these DC Currents

Human Skin Surface Voltages

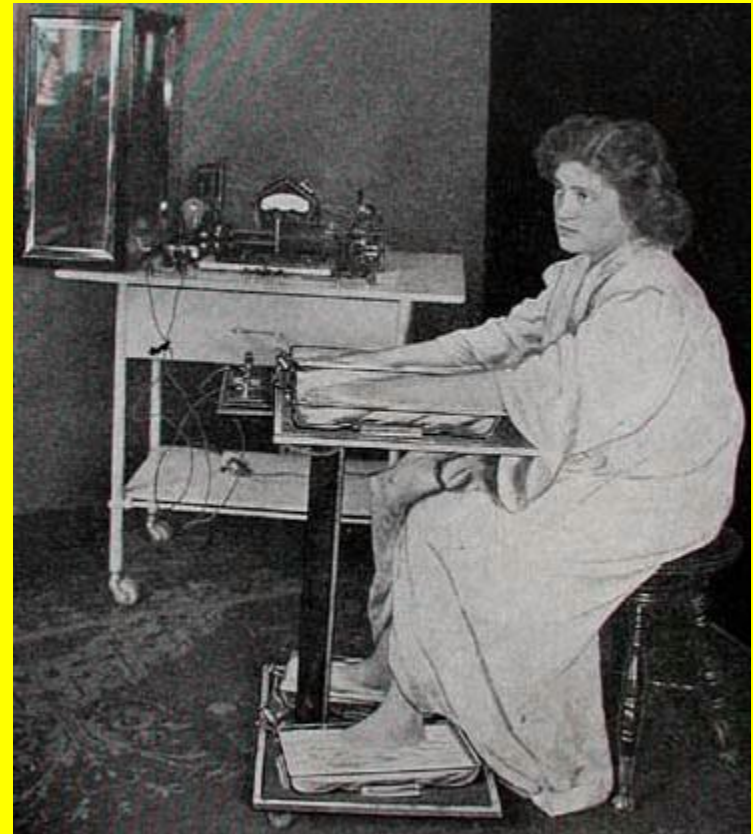


Field-Induced Voltages Might Interact with these DC Voltages

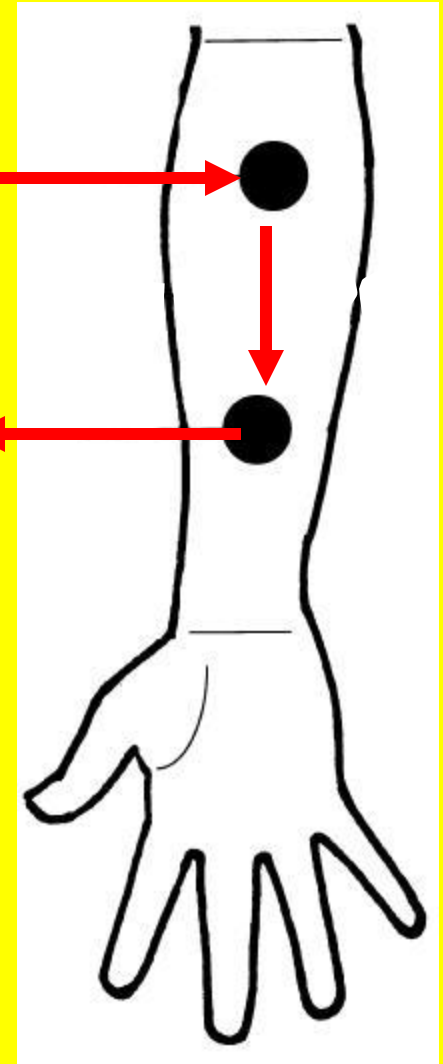
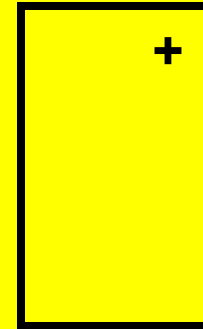
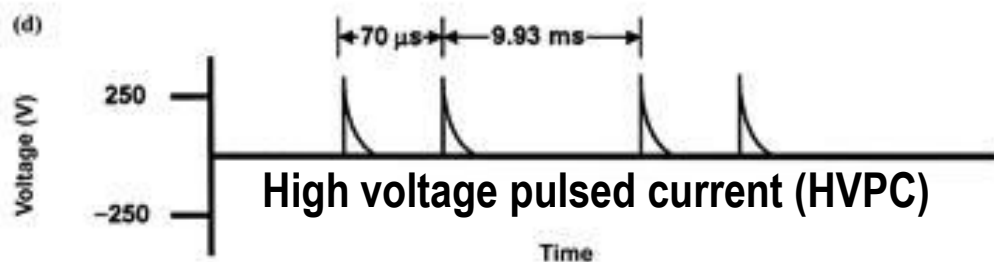
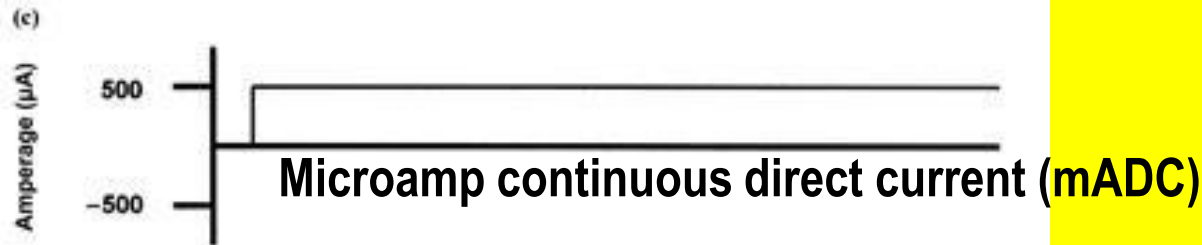
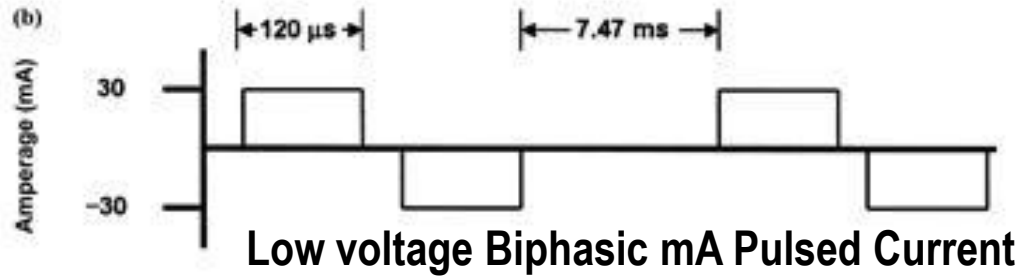
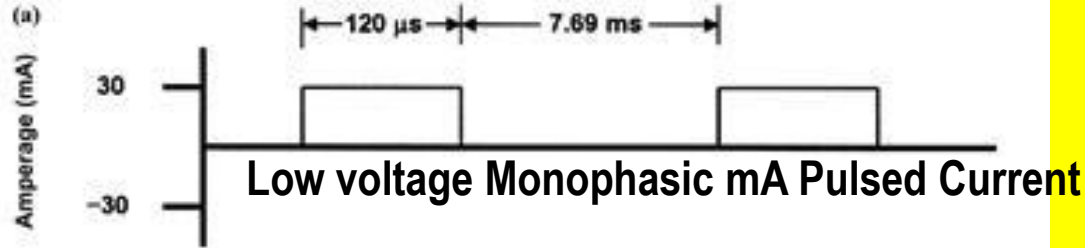
Trans-skin voltages (n=17)

EMF Application Modalities

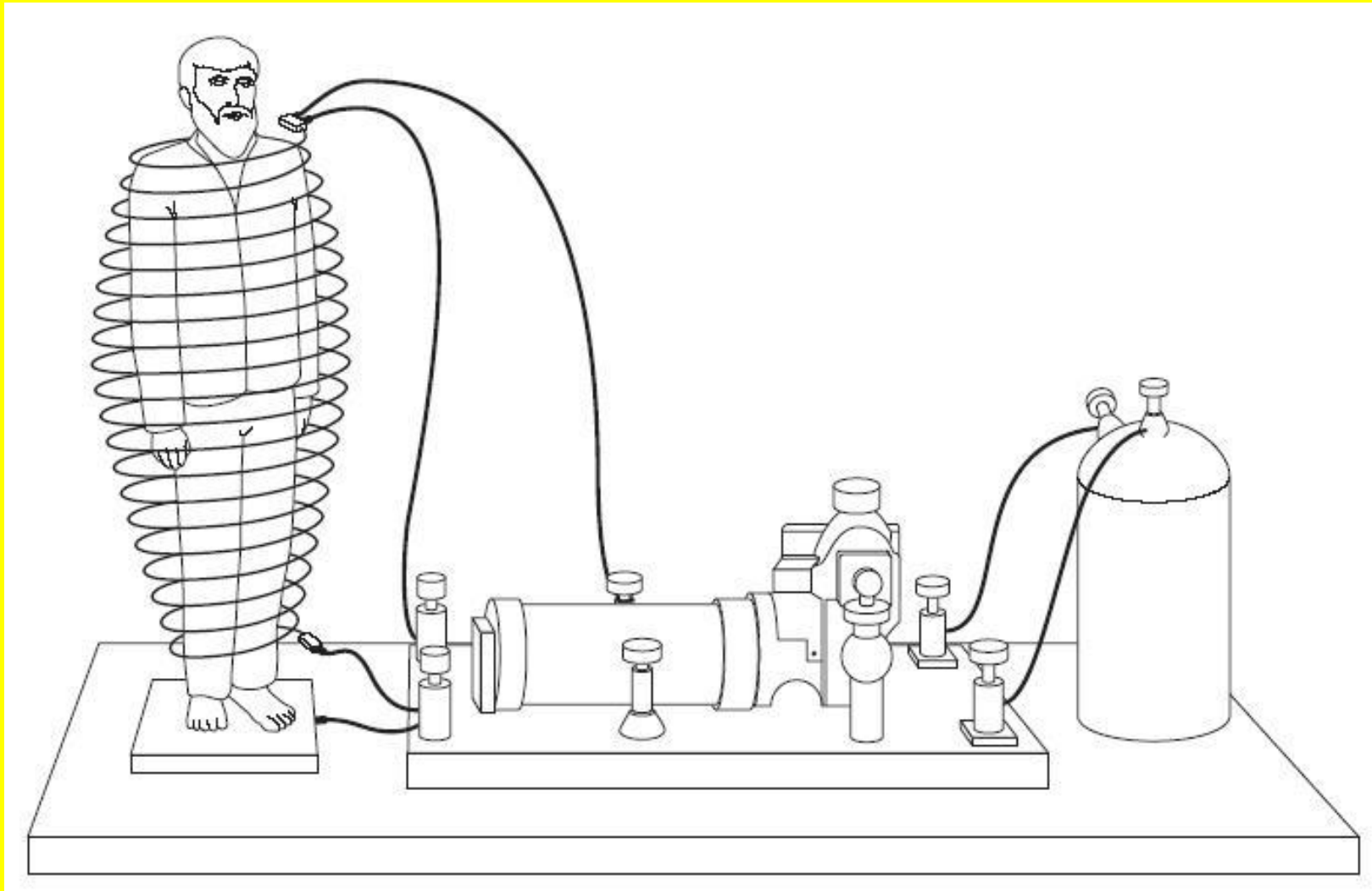
Electrodes (Contact) & Electrode-less (Non-Contact)



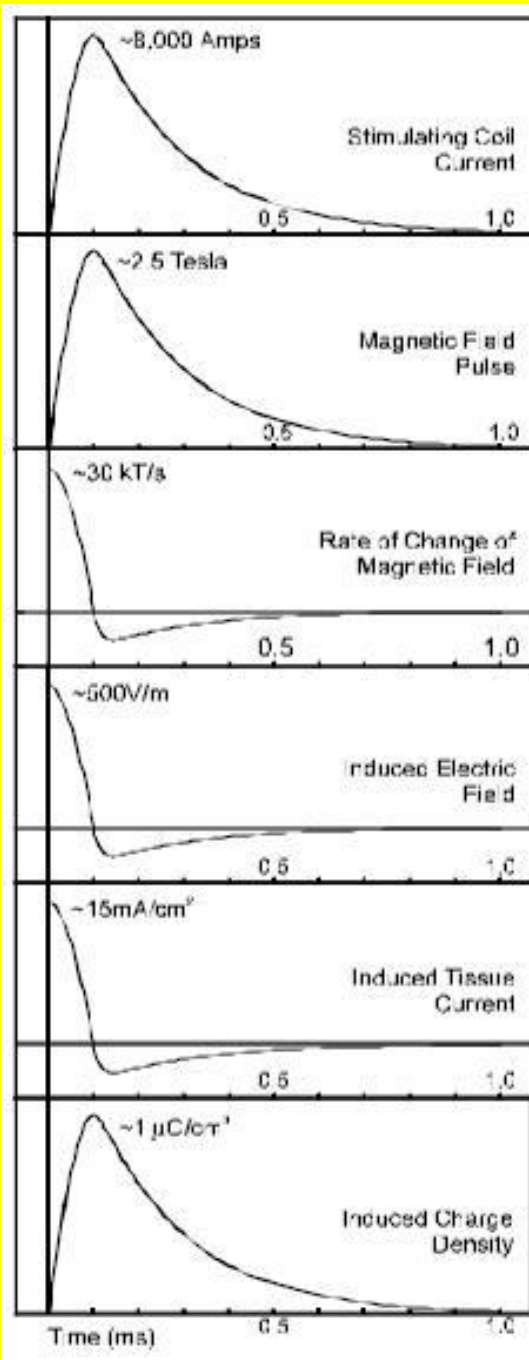
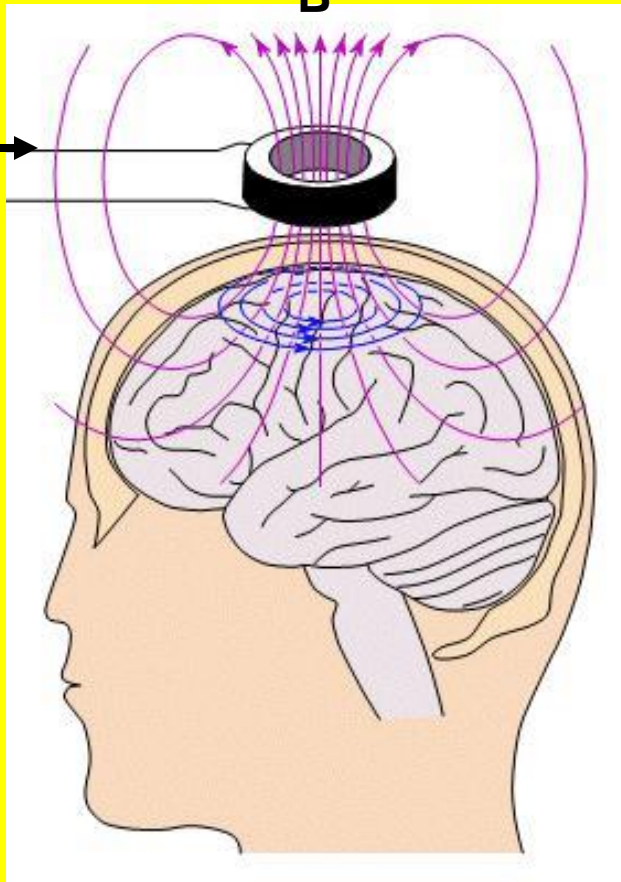
Contact Electro-Stimulation



Non-Contact Electromagnetic *Induction*



Patent 96,044 1869

B

Body Tissue	Conductivity
Blood Plasma	1.4 S/m
Spinal Fluid	1.4
Nerve, axoplasm	0.91
Whole Blood	0.62
Skeletal Muscle, long axis	0.53
Brain, grey matter	0.45
Nerve, extracellular fluid	0.33
Brain, white matter	0.15
Liver	0.14
Bone, longitudinal direction	0.067

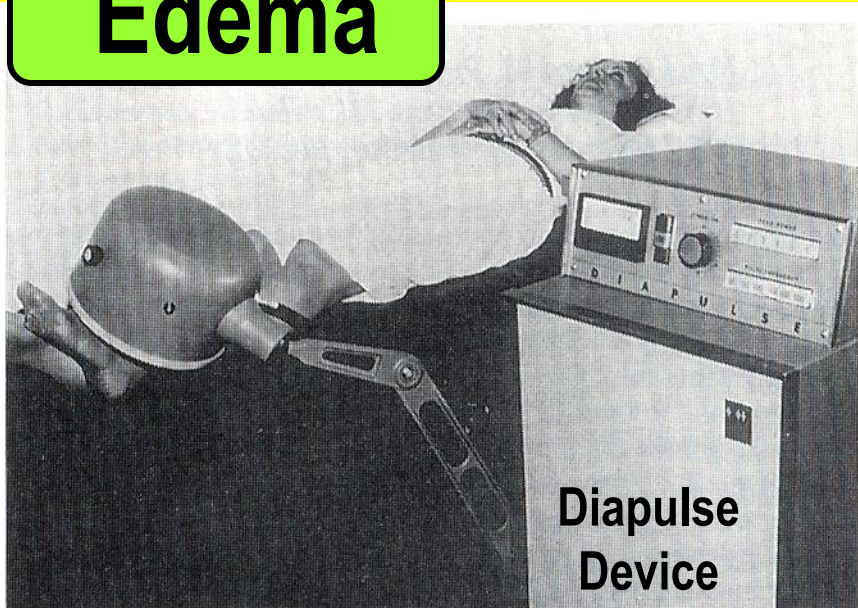
Transcranial Magnetic Stimulation (TMS)

$$J(t) = E(t) \times G_{\text{TISSUE}}$$

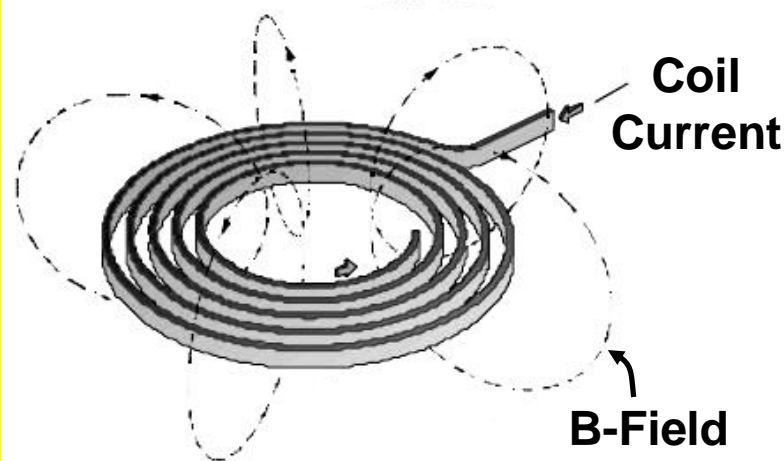
Amps/m² Siemens/m

Edema Reduction Evidence?

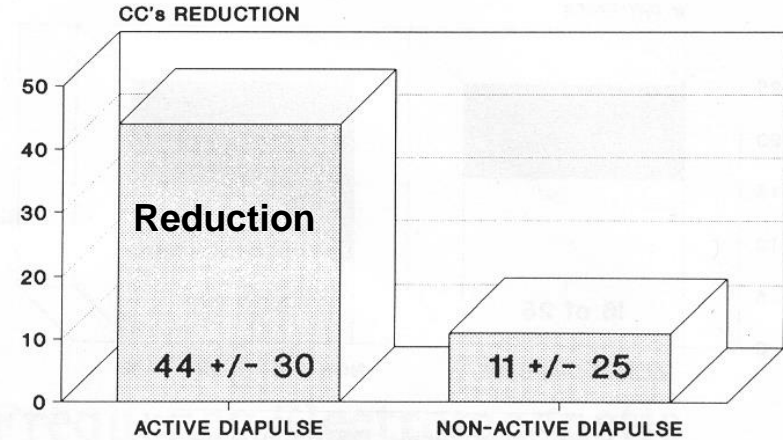
Edema



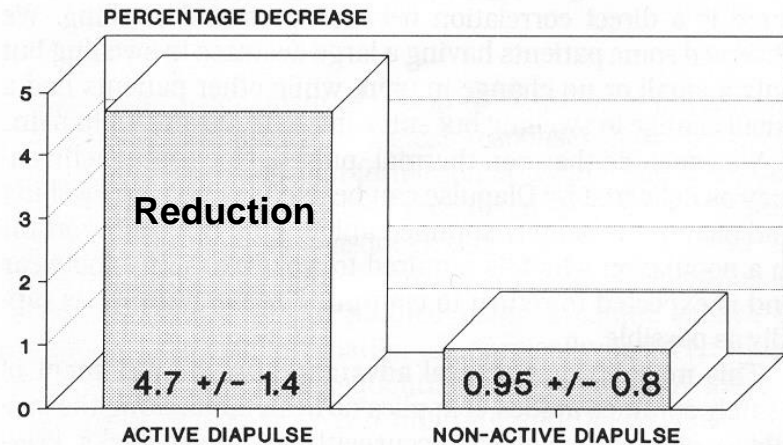
Treatment of 50 Ankle Sprains Within 72 hours of injury
 30 min – medial, 30 min – lateral 10 min – epigastric
 Volumes measured before and after



TREATMENT RESULTS REDUCTION IN SWELLING



TREATMENT RESULTS PERCENT VOLUME DECREASE

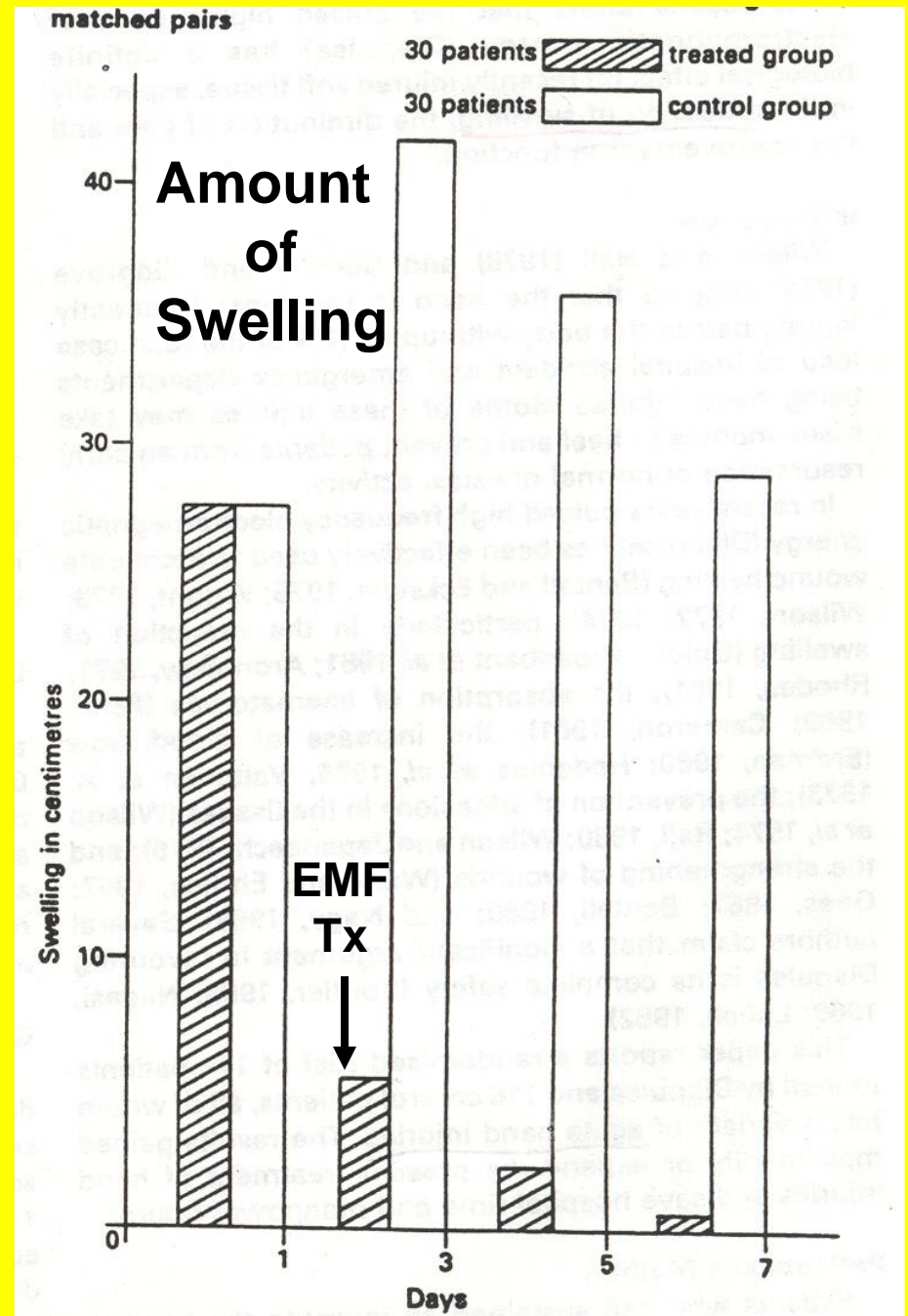


Edema

230 Hand or Thumb Injuries
Seen within 36 hours of injury

During each visit (every other day)
Received two ½ hour treatments
Diapulse Device

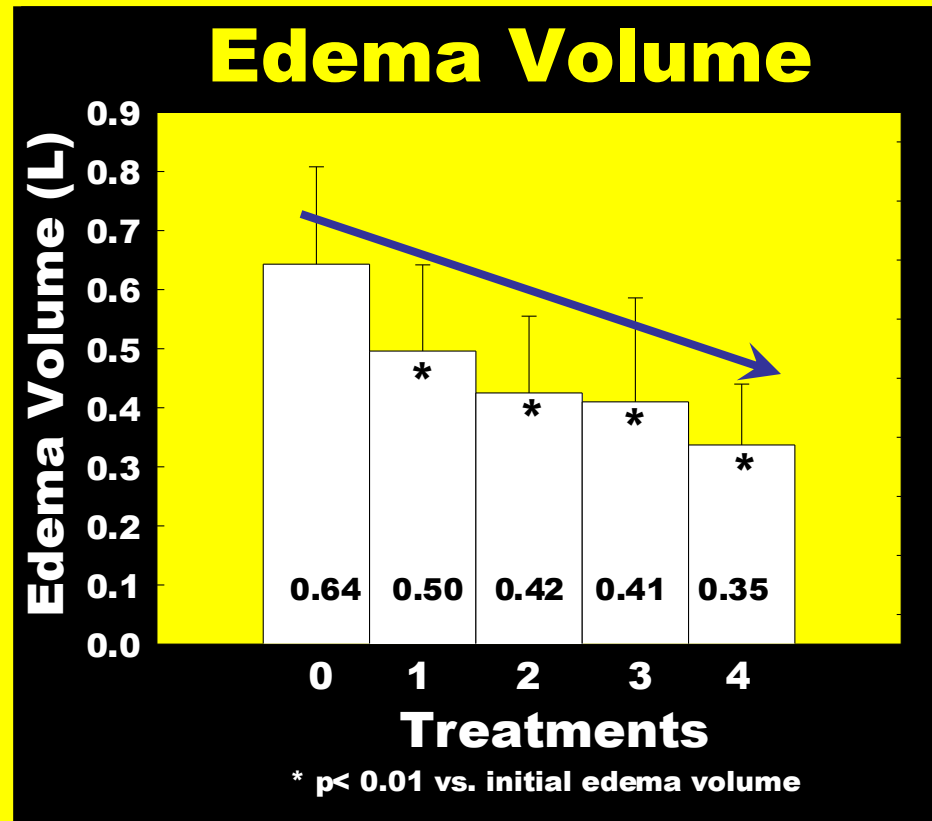
30 matched-pairs based on
Age – sex – degree of trauma



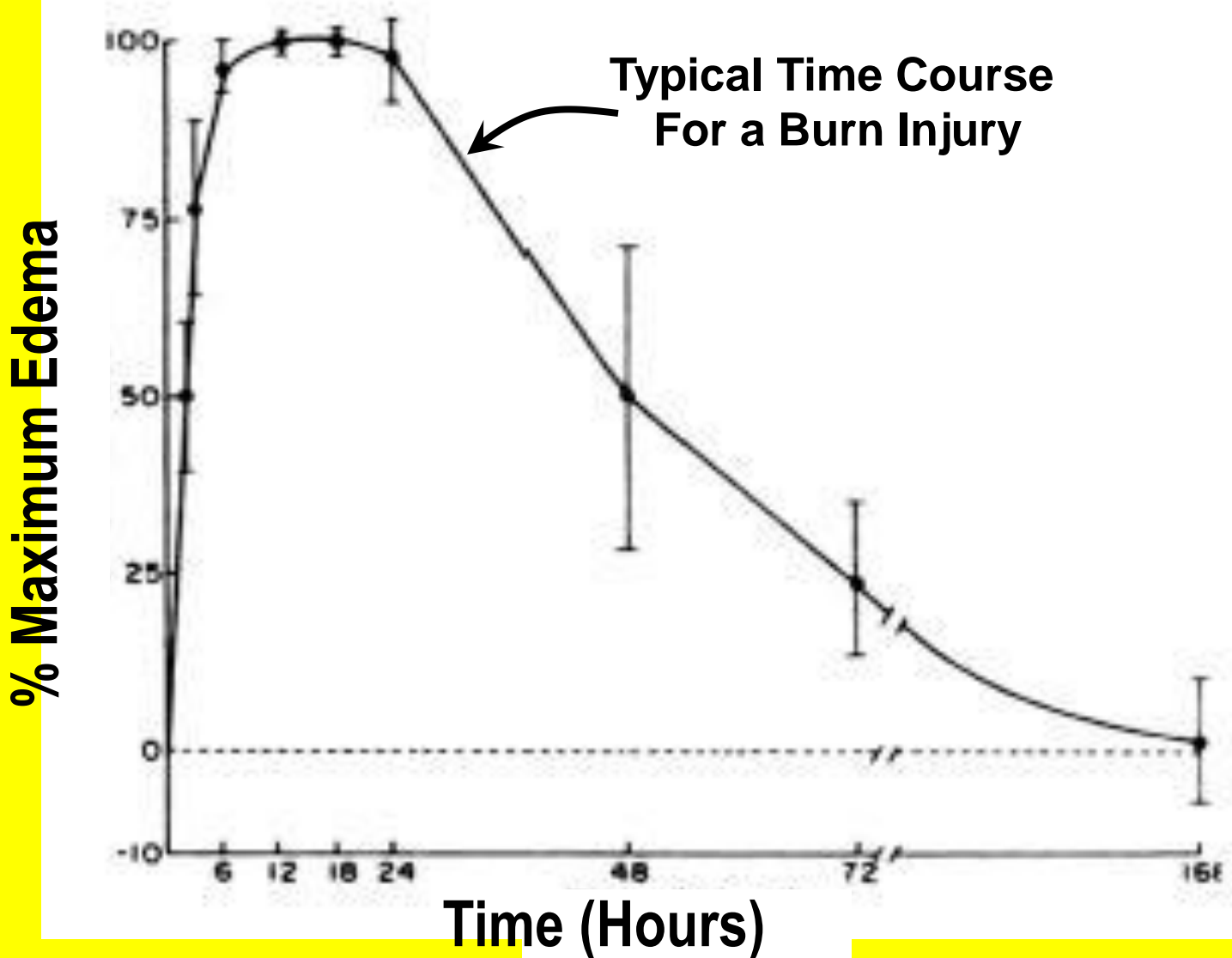
Lymphedema



- High protein content edema secondary to node removal and/or radiation therapy
- Occurs in 20-40% of postmastectomy women from months to years after surgery
- Usually progressive if untreated - Fibrosis



Experimental Burn Injury

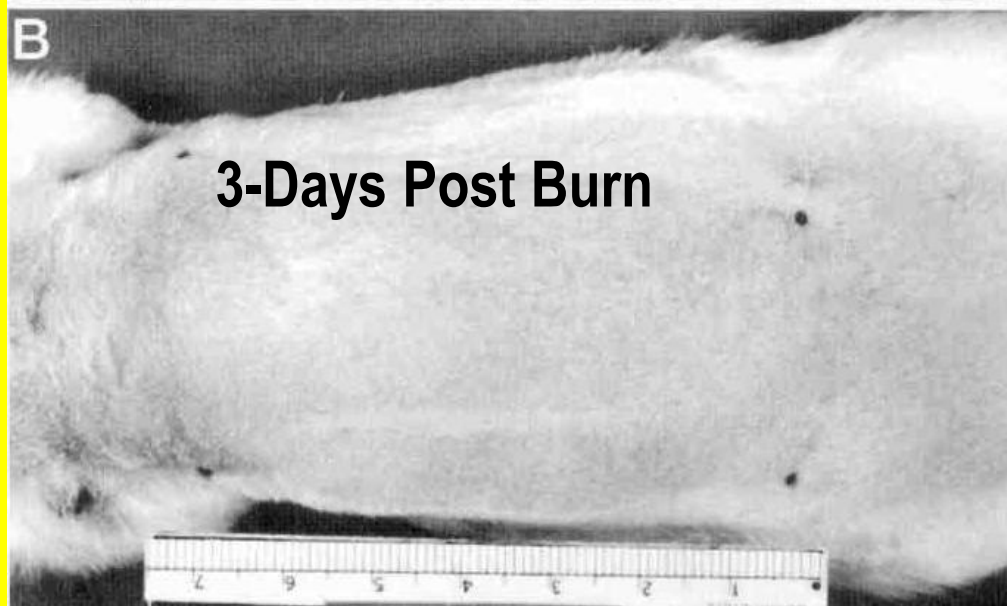


Edema Inhibition in Burn Injury



Full Thickness
Scald Wounds
Boiling water for 10s

Untreated



With $-40\mu\text{A}$

*Chu: J Trauma,
Volume 40(5).
May 1996.738-742*

Two Days Post Burn



Protein Leak Less

SN Dressing Only

**Visible Evans Blue
(Bound to albumin)**

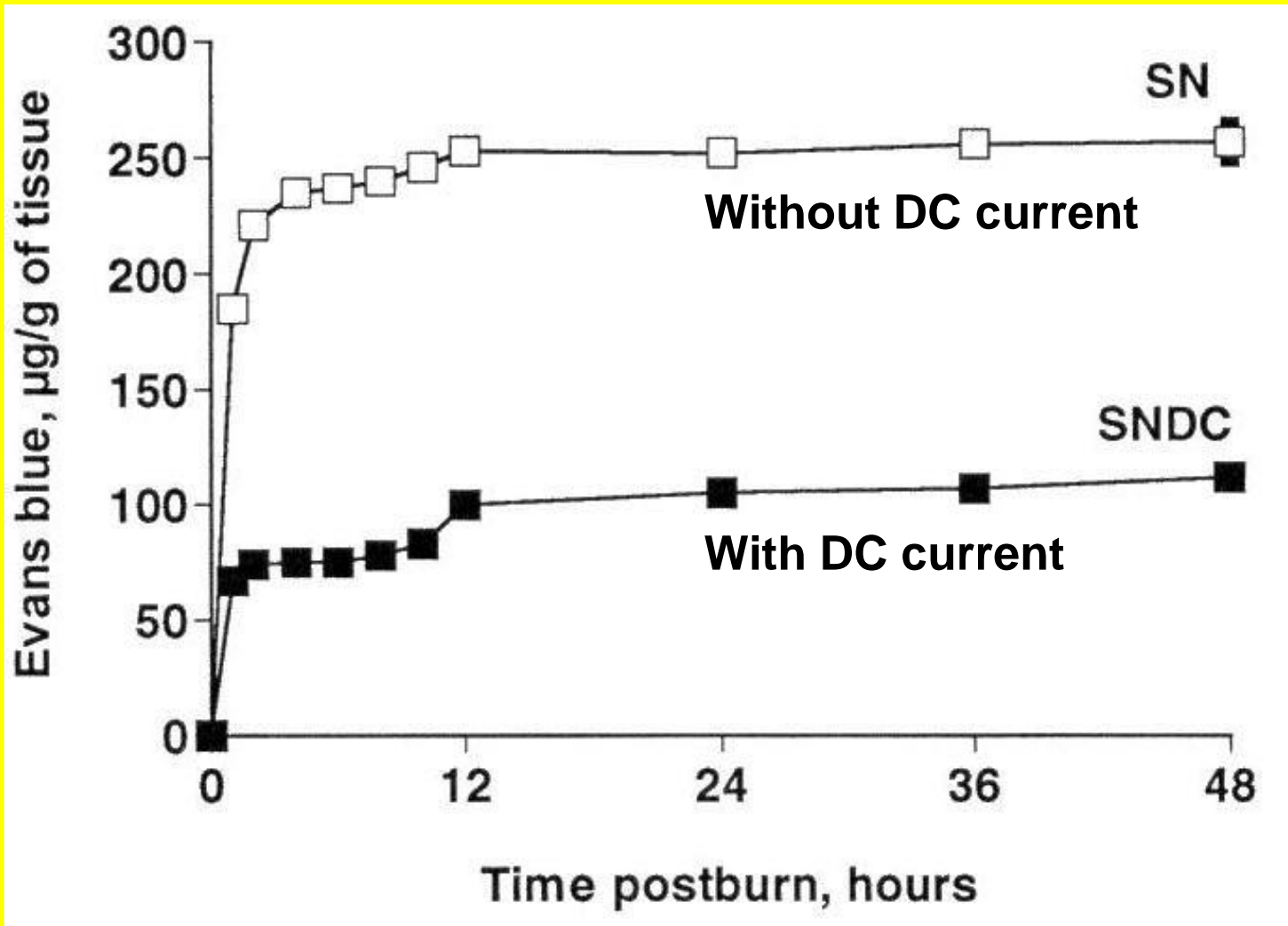
SN Dressing with 40 μA DC

Cross-Section of Underside of SN

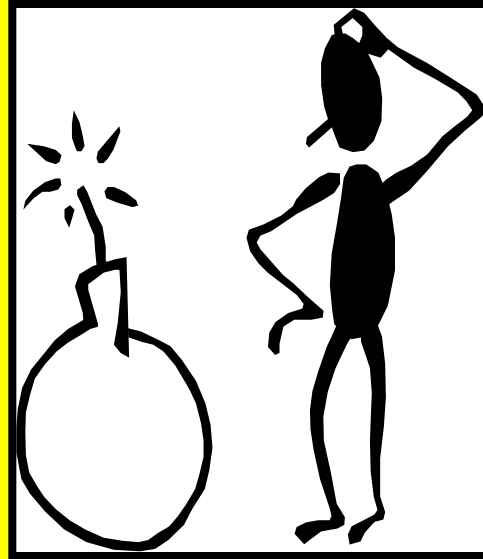
Dermis

Pannicular M.

Quantitative Protein Leak



So – What's Going On?

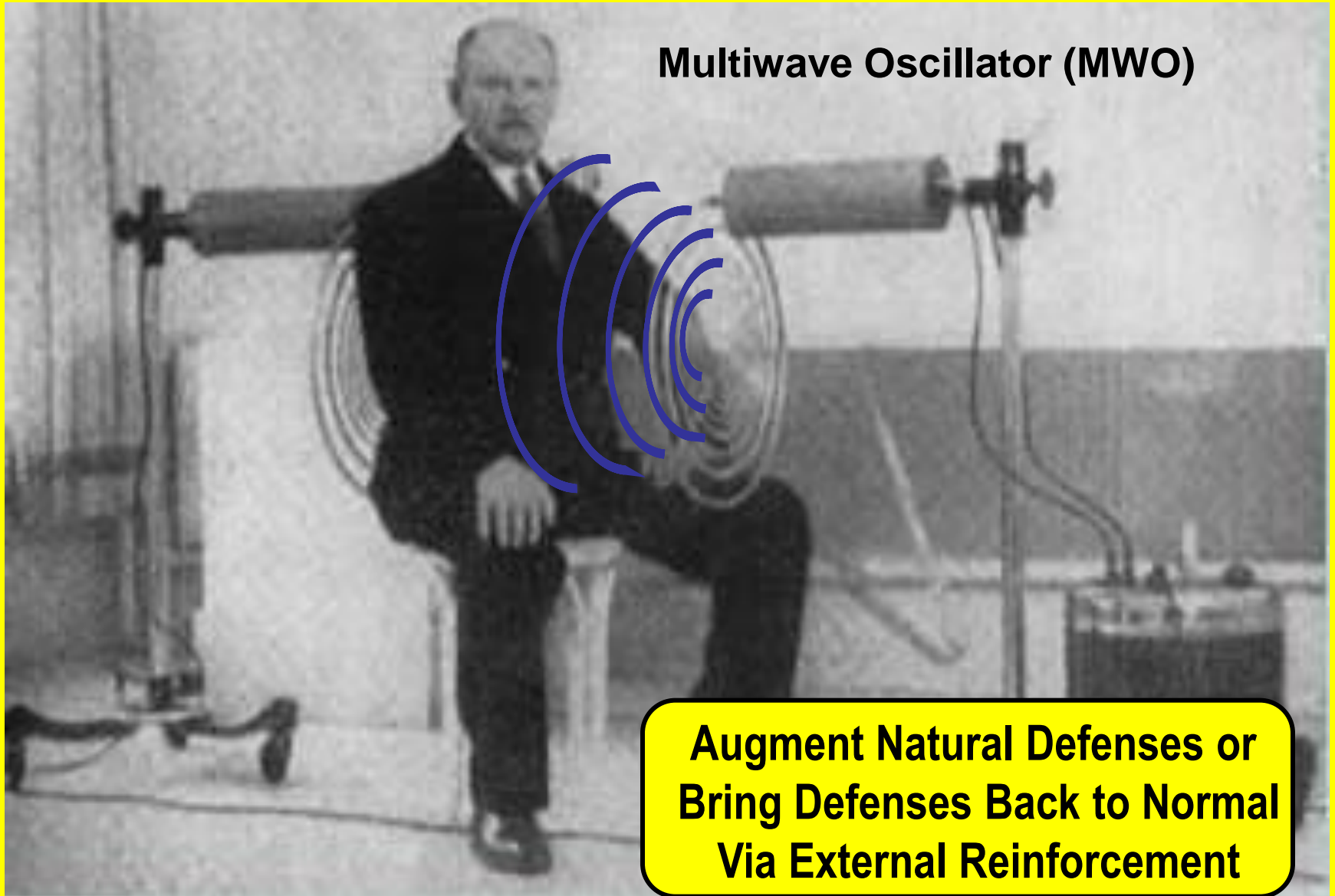


Short Answer – Not Sure!!

Some Things to Ponder

Georges Lakhovsky ~ 1924

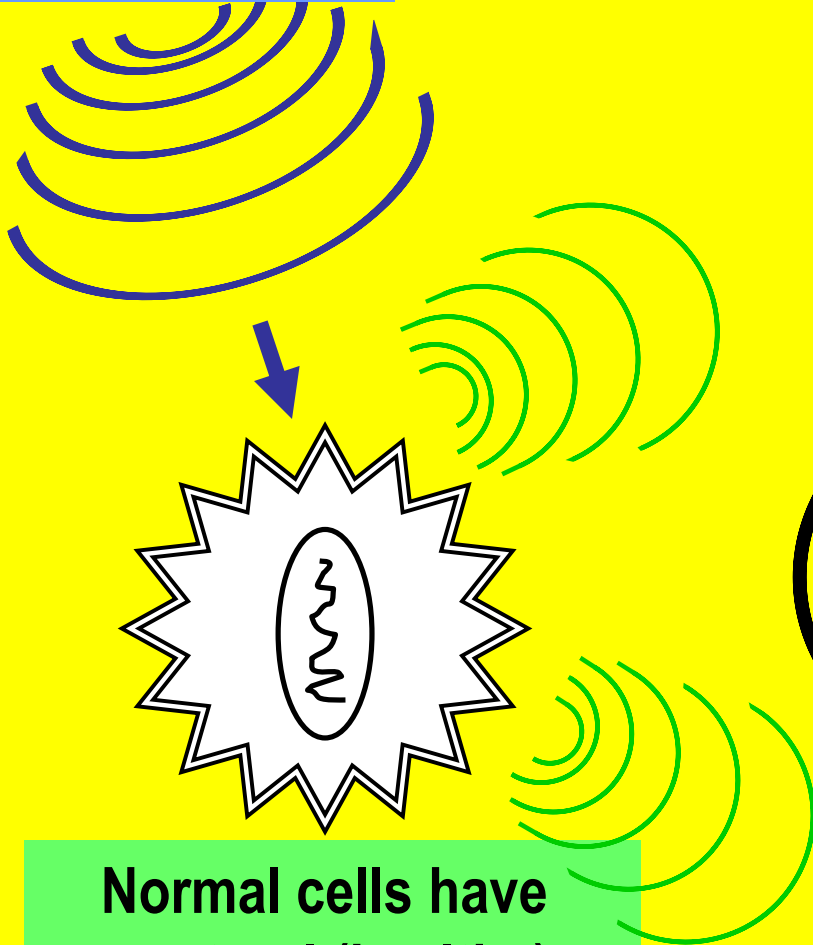
Multiwave Oscillator (MWO)



**Augment Natural Defenses or
Bring Defenses Back to Normal
Via External Reinforcement**

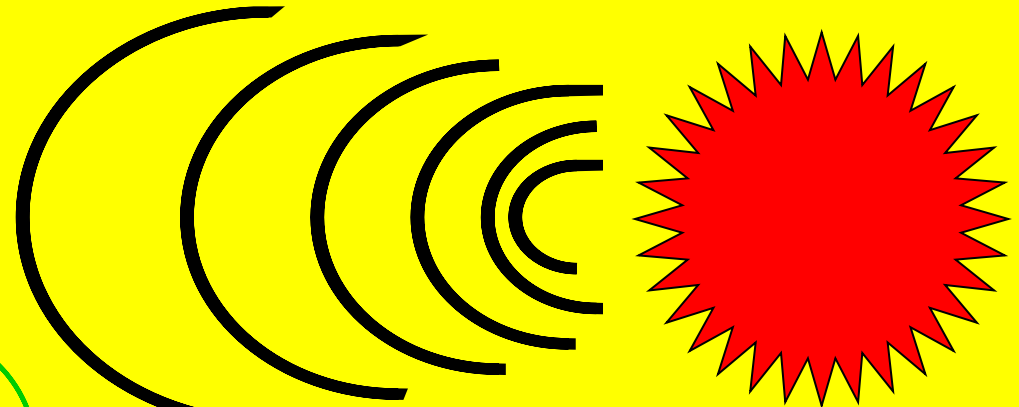
Lakhovsky's Concept

External Reinforcement



Normal cells have a natural (healthy) vibrational equilibrium frequency

Augment Natural Defenses or Bring Defenses Back to Normal Via External Reinforcement



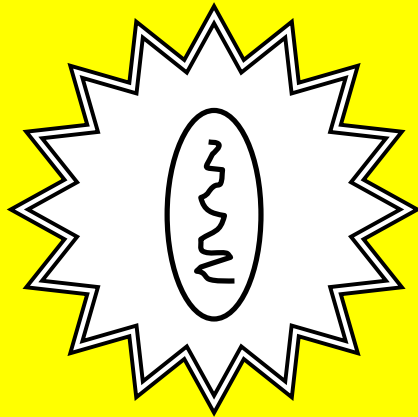
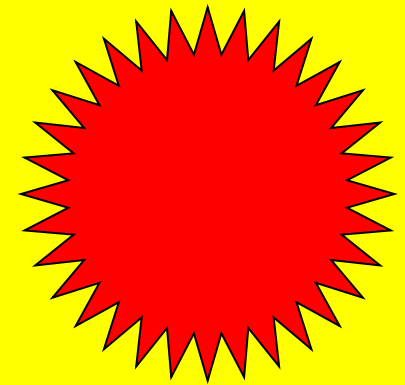
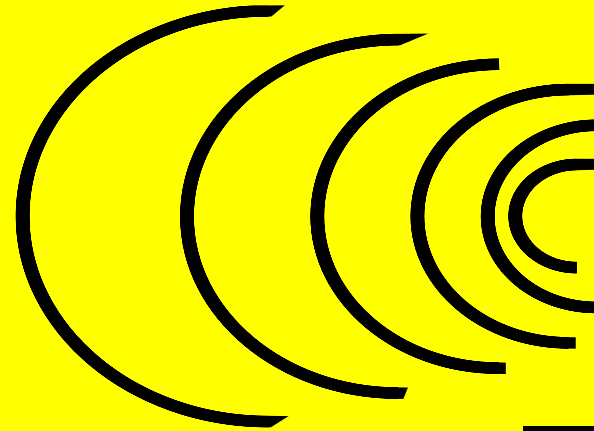
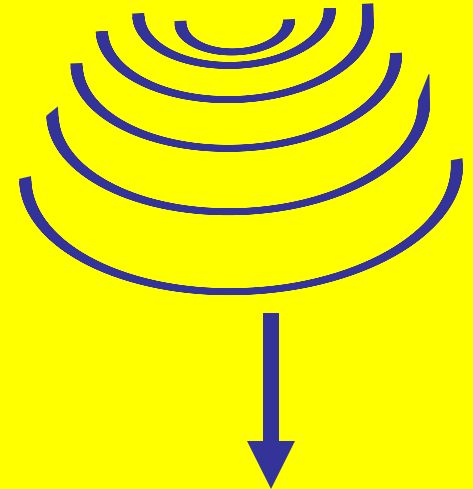
Overwhelm Normal Cells

Microbes/ Viruses also have intrinsic oscillatory frequencies

Royal Raymond Rife ~ 1934



**Destroy or Devitalize
the Bad Guys via
External Wide Band
EMF Excitation**

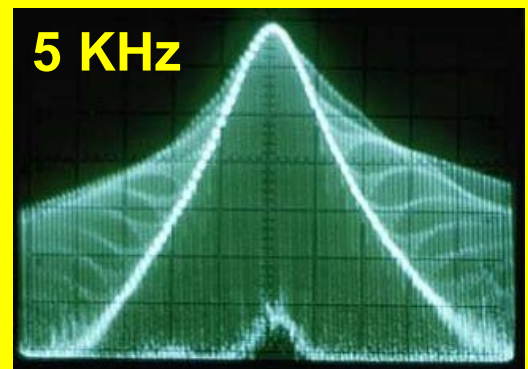
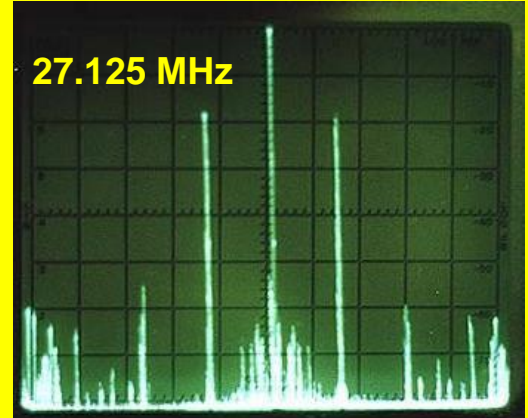
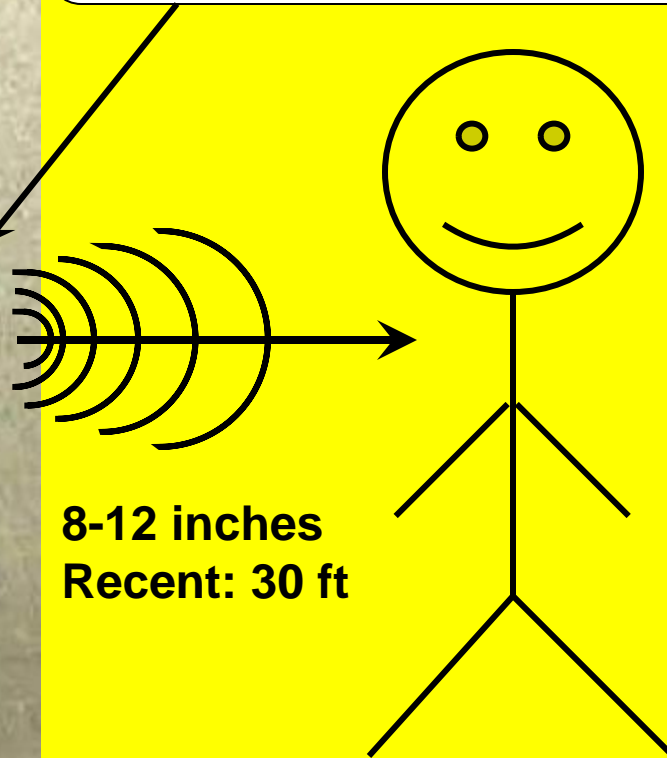
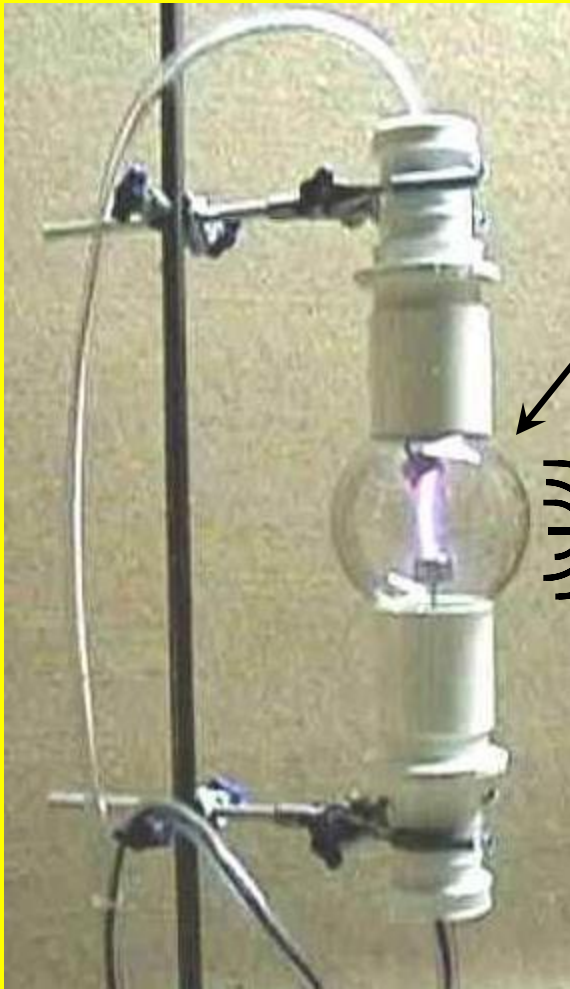


**Normal cells have
a natural (healthy)
vibrational equilibrium
frequency**

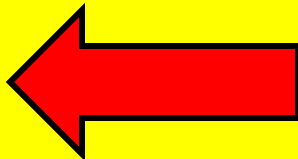
**Pathogenic Actions
on Normal Cells**

**Microbes/ Viruses
can be Destroyed
or Devitalized by
exposure to
appropriate
frequencies**

Radio Energy Excited Gas Plasma Tube as an Antenna

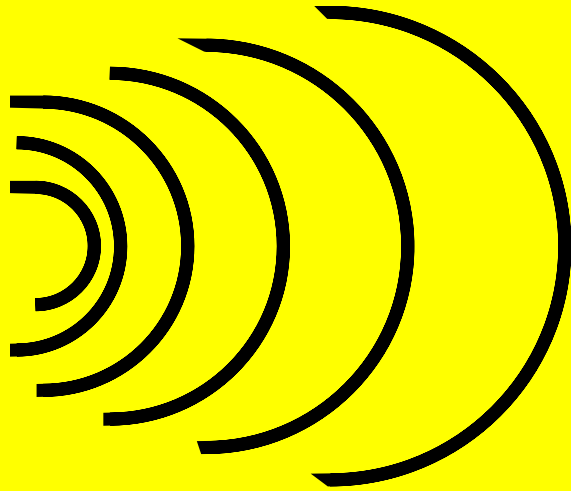


Bad Guy

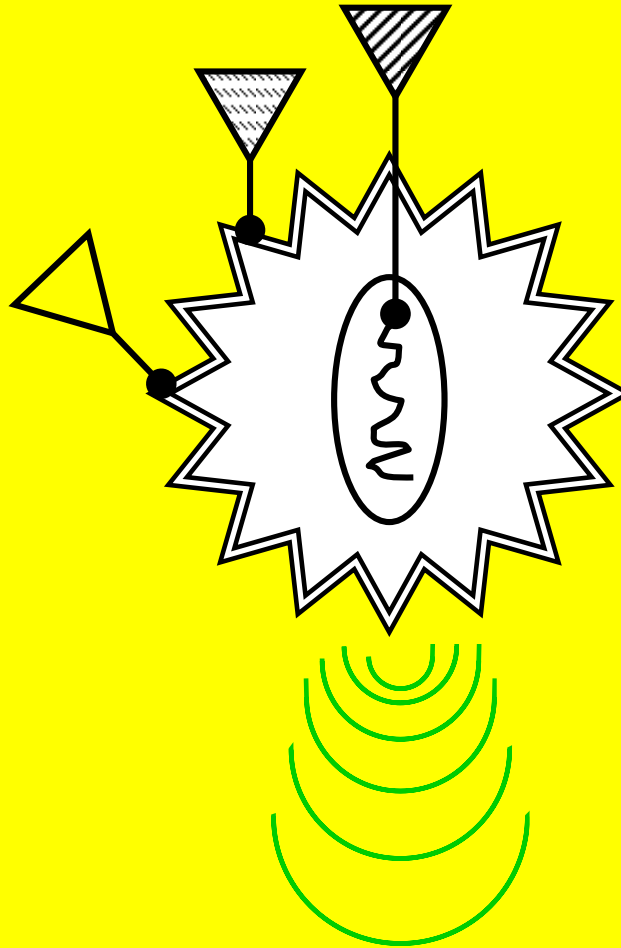


Each of the multitude of frequencies has an associated impedance and phase angle.

Overriding General Precept



**Complex
Modulated
Multi-frequency
Multi-Phase
Waves**



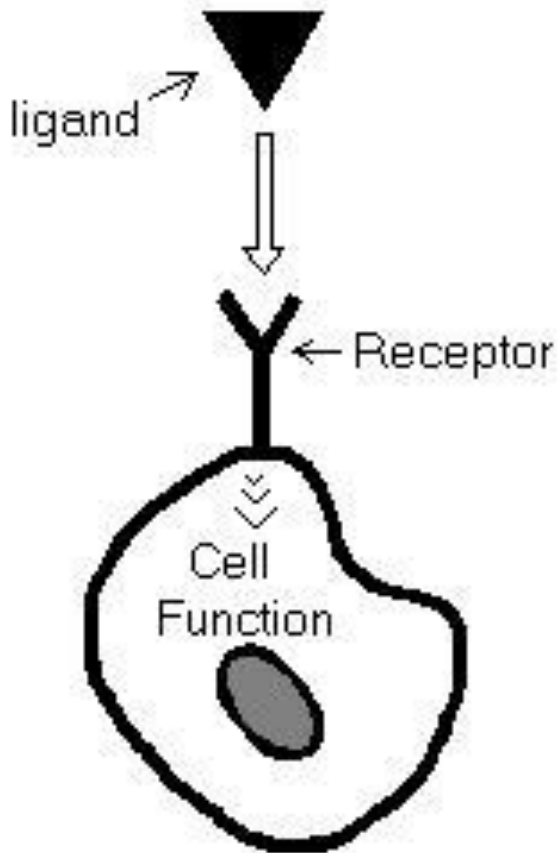
**Demodulation
Resonance
Entrainment**



**Altered
Physiological
Function**

**Key/Keyhole
interaction model**

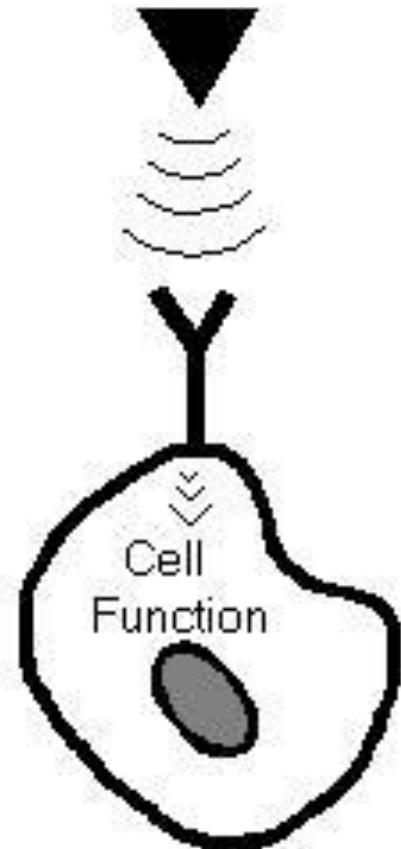
**The Current Theory:
"structural matching"**



**Jacques
Benveniste**

**But suppose
this were true**

**The Proposed Theory:
"electromagnetic signals"**



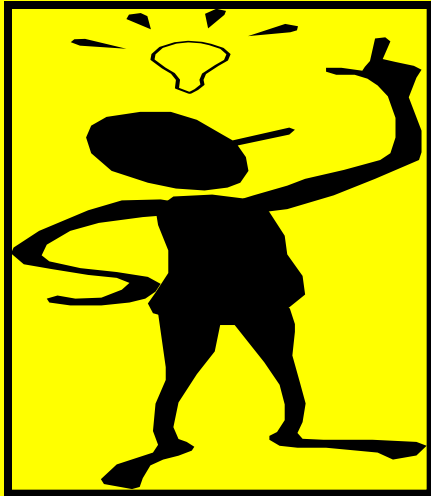
Challenge

As your fertile minds begin processing the vast amount of new information you will get
keep in mind this unsolved problem



Ponder

Just maybe you will discover the basis for a potential causal – mechanistic link!



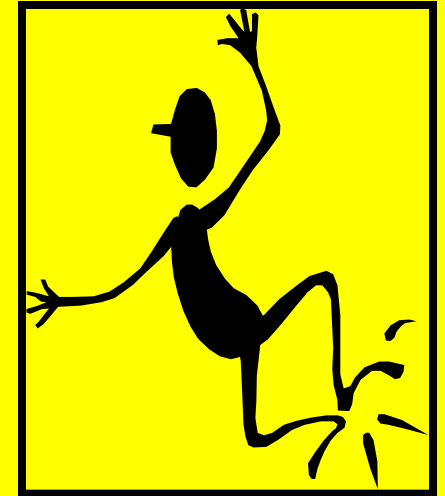
Postulate



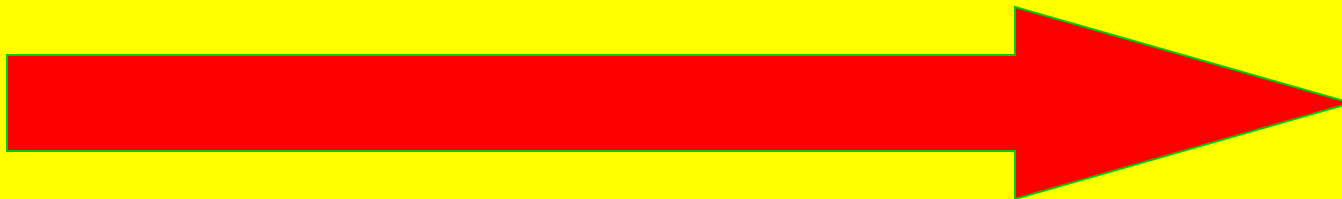
Pursue



Pin-it-Down



Party!



**Thanks for your
Attention!**