

# Acupuncture: New and Old Concept for Healthcare



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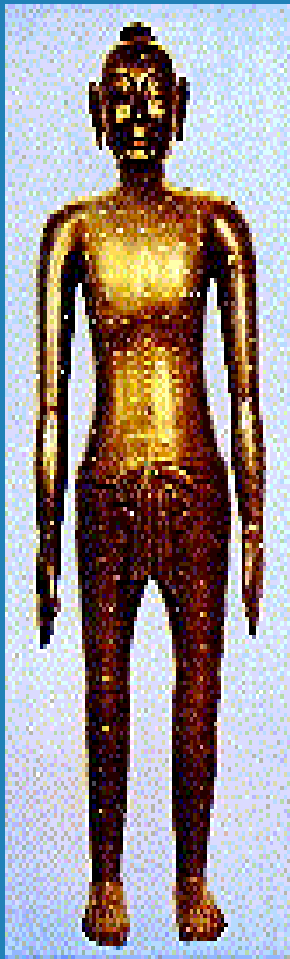
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# What is Acupuncture



- is one of the key components of traditional Chinese medicine (TCM)
- is a family of procedures to stimulate points on the body (acupoints)—most commonly is the insertion of thin, solid metallic needles.
- is intended to remove blockages in the flow of energy ("Qi"), restore and maintain health
- is with thousands of years' history

# Types of Acupuncture



Classical  
acupuncture



Electroacupuncture



Laser  
acupuncture



Cupping



Acupoint  
injection



Moxibustion



# Acupuncture: A New Concept for HealthCare in US

Current health care:  
"mainstream" medicine—  
Conventional or Western Medicine

- **Prevention:** vaccination, isolation...  
no acupuncture
- **Diagnosis:** Not use TCM method
- **Treatment:** Not include as a routine method
- **Healing:** Not include as a routine method
- **Insurance:** No cover for prevention, no cover for acupuncture

Acupuncture?  
...never heard of  
it



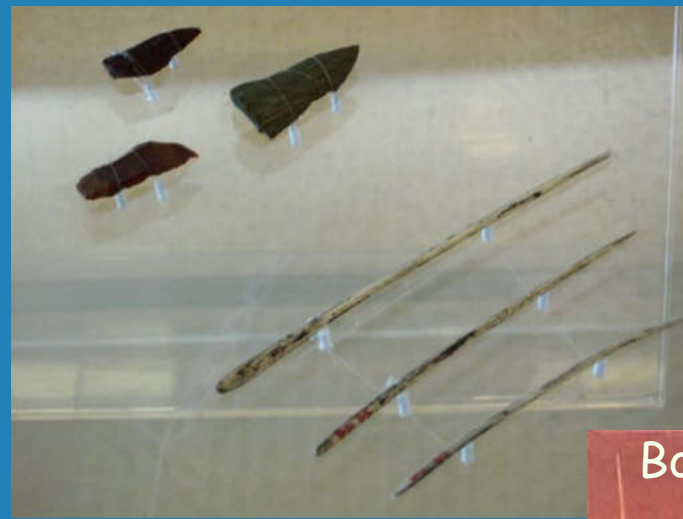


# Acupuncture: An old Concept for HealthCare in the East





# How Old Is Acupuncture?



"Bian" Stone and  
Bone needles

New Stone Age 5000BC



# Acupuncture: An old Concept

## Ancient Needles



Gold needle

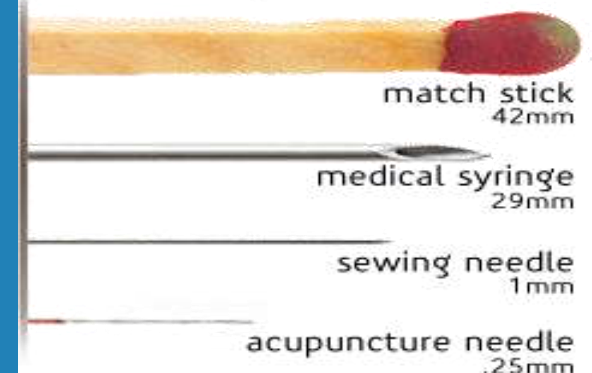
Silver needle

Han Dynasty, 200BC-220AD

## Modern Needles



Even smaller than a sewing needle...



match stick  
42mm

medical syringe  
29mm

sewing needle  
1mm

acupuncture needle  
.25mm



# Acupuncture: An old Concept for HealthCare in the East

- Acupuncture is a key component of **traditional Chinese medicine (TCM)**
- **TCM** had been a main healthcare system for thousands of years before western medicine introduced
  - **Prevention:** Diet, herbal remedies, qigong, **acupuncture**, TuiNa...
  - **Diagnosis:** Use all TCM methods: yin-yang, tongue, pulse, **Meridian, five elements...**
  - **Treatment:** **Acupuncture, moxibustion**, herbal remedies, TuiNa, Diet, qigong ...
  - **Healing:** All TCM modalities including **acupuncture**
  - **Insurance:** Cover All TCM modalities including **acupuncture**



# What Is Traditional Chinese Medicine (TCM)

A whole medical system that originated in China. It is based on the concept that disease results from disruption in the flow of qi and imbalance in the forces of yin and yang. Practices including **acupuncture**, herbs, meditation, massage, and diet seek to aid healing by restoring the yin-yang balance and the flow of qi.

*--NCCAM*

- A medical system with 3,000+ year's history for prevention, diagnosis, treatment and rehabilitation of illness
- Holistic perception of mind, body, health and diseases
- Unique terminology and medical theories
- Individualized (personalized) medicine
- Comprehensive plan for **healthcare**

# Comparison of East & West

## East

- ∞ Empirical Observations over Thousands of Years
- ∞ Art of Medicine
- ∞ Holistic View
- ∞ Circular Logic
- ∞ Energetic

## West

- ∞ Scientific Method & Case-Based Medicine
- ∞ Technology of Medicine
- ∞ Molecular and Organ View
- ∞ Linear Logic
- ∞ Mechanistic

# Modalities of TCM

- ∞ Acupuncture, moxibustion and cupping
- ∞ Chinese Materia Medica and Prescription:
  1. Botanical Sources -Herbology  
(root, stem, bark, leaf, flower, fruit and seeds)
  2. Zoological sources  
( antilope/buffalo horn, chicken gizzard membrane, musk, turtle shell, oyster shell etc.)
  3. Mineral- (Gypsum, mirabilite, borneol, cinnabar, etc.)
- ∞ Tui Na/Body manipulation (massage, acupressure, corrective manipulation)
- ∞ Qigong/Tai'Chi
- ∞ Diet/nutrition

# Traditional Chinese Medicine



Guang Ci Tang® 'Pian' (Tablets)  
200 tablets per bottle



Guang Ci Tang® 'Wan' (Pills)  
200 pills per bottle



borneol (natural)  
天然冰片

## Alimentotherapy







# Basic Principles of TCM

- **Ying-Yang**
- **Qi, Xue (blood), Jing (Essence), Ye (body fluid)**
- **Zang-Fu (Internal Organ)**
- **Maridian (Channel)**
- **Five element**

5 Element Cycle

- Productive
- Destructive
- Weaken





# Yin-Yang

- The Tao of Universe
- The principle of all matters
- The parentage of all change
- The origin of birth and death

--Su Wen

The Tao is the One,  
From the One come Yin and Yang;  
From these two, creative energy;  
From energy, ten thousand things;  
The forms of all creation.

All life embodies the yin  
And embraces the yang,  
Through their union  
Achieving harmony.

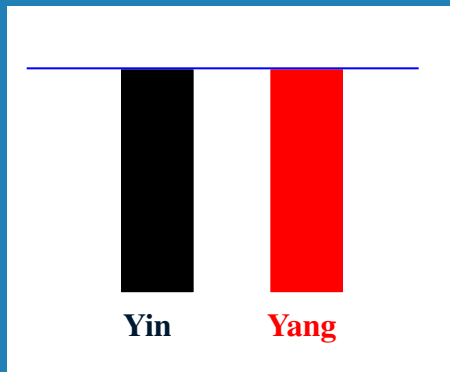
--Tao Te Ching, C42



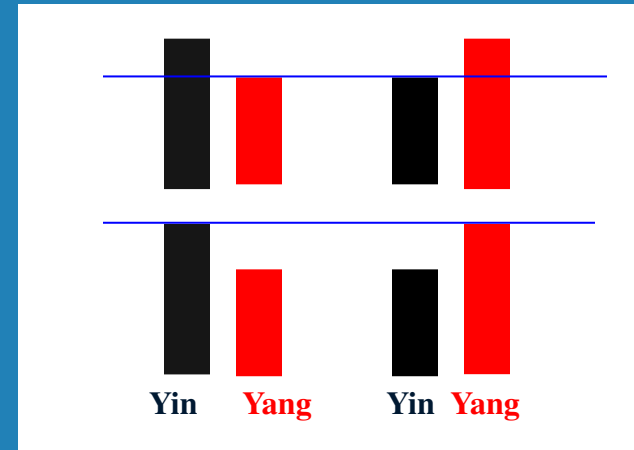
# Yin-Yang

- Concept describing how things function in relation to each other and to the universe
- complementary opposites as parts of whole

## Yin-Yang balance



## Yin-Yang imbalance



## Yin-Yang relationship:

- Opposition
- Interdependence
- Mutual consumption
- Inter-transformation

# Application of Yin-Yang

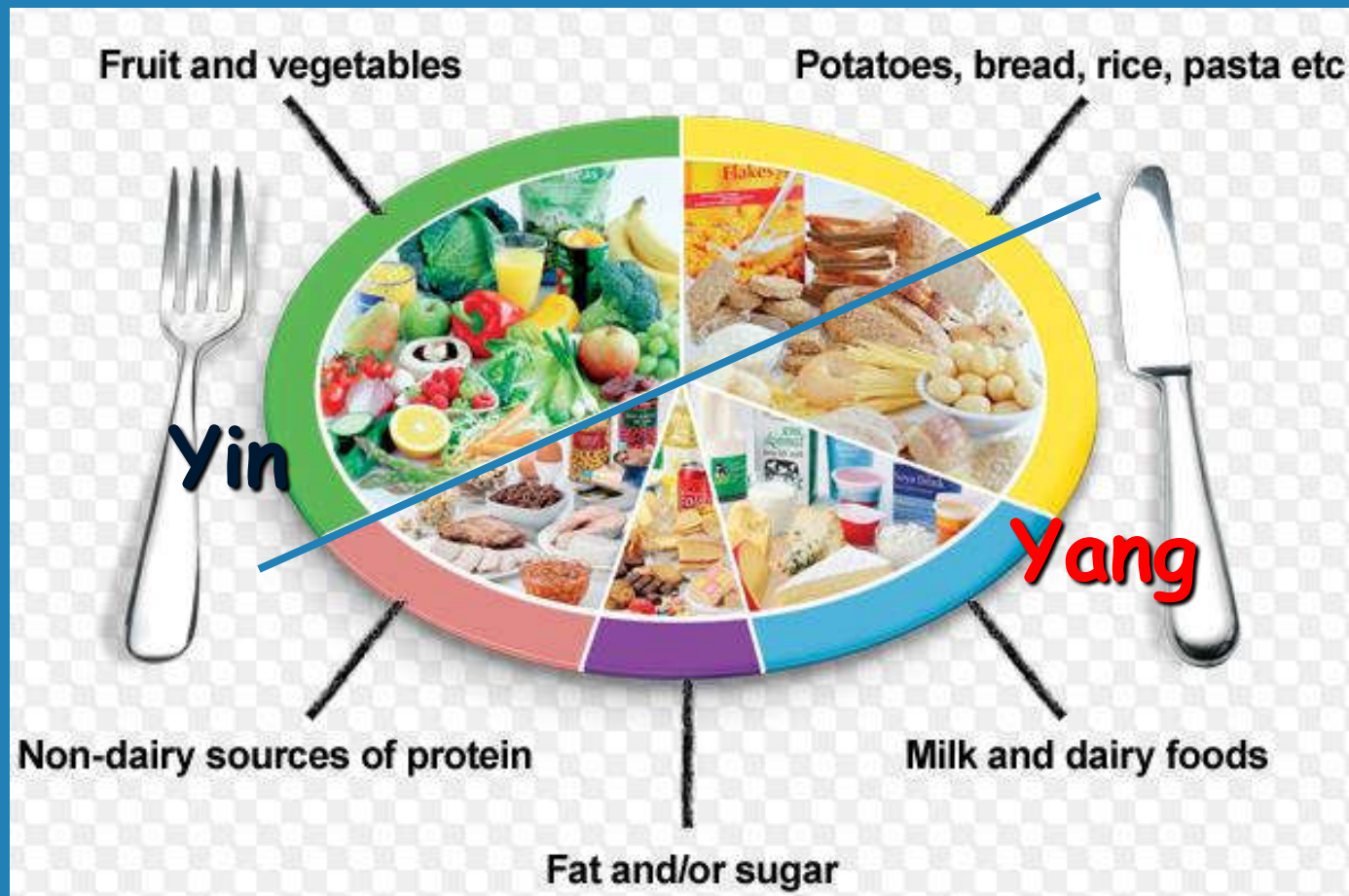


	YIN	YANG
•Structure of human body	front, interior	back, exterior
•Physiology	structure	function
•Pathology	hypo-function	hyper-function
•Diagnosis	exterior, heat, excess	interior, cold, deficiency
•Chinese medicine	cold/cool, sour, salty, bitter	hot/warm, pungent, sweet
•Treatment	replenish Yin/ <b>Yang</b> deficiency, reducing excessive heat or fire with cold drug; treating excessive cold with warm drug	

# Application of Yin-Yang



Eat balanced



# Application of Yin-Yang

Keep fit physically and mentally



**Yang**



**Yin**



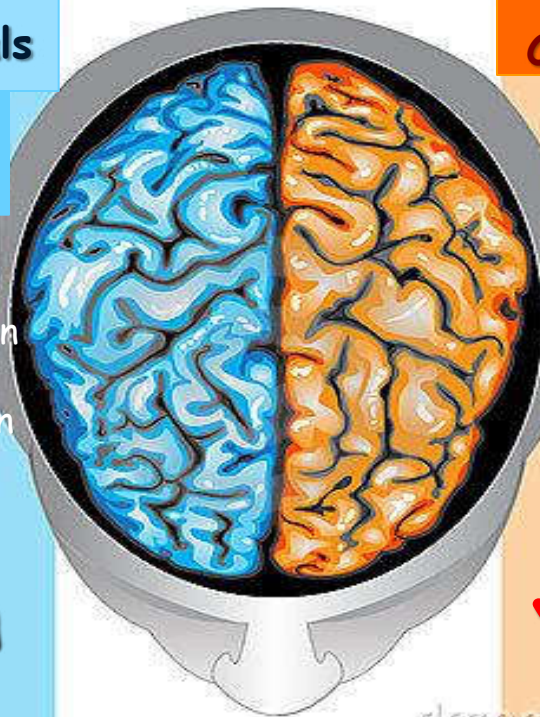
# Brain Yin-Yang



## Yin Chemicals

GABA  
Glycine  
5-HT  
DA  
Endorphin  
Estrogen  
Melatonin  
...

**Yin**



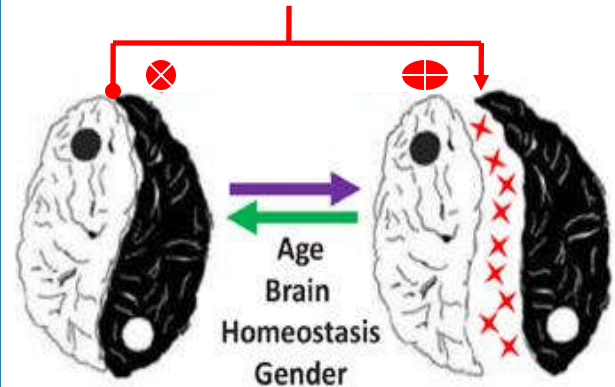
## Yang Chemicals

Glutamate  
NE  
Ach  
Adenosine  
Testosterone

**Yang**

dreamstime.com

## Stress Nicotine



Normal:  
Attention  
Memory  
Mood  
Neurogenesis

Abnormal:  
Attention deficit  
Memory deficit  
Depression/Anxiety  
Neurodegeneration  
Decreased Neurogenesis  
Oxidative stress

Sleep/memory Yin-Yang

Balanced

Imbalanced

# Qi (Chi 气)



**Qi --life energy, moving force (Yang)**

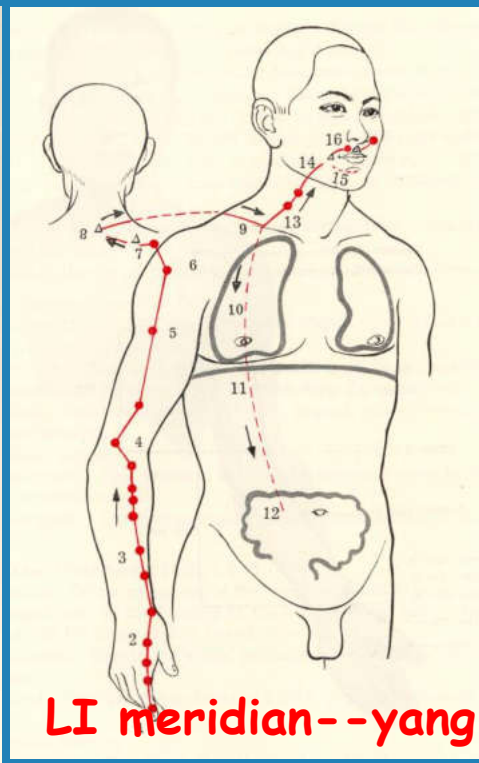
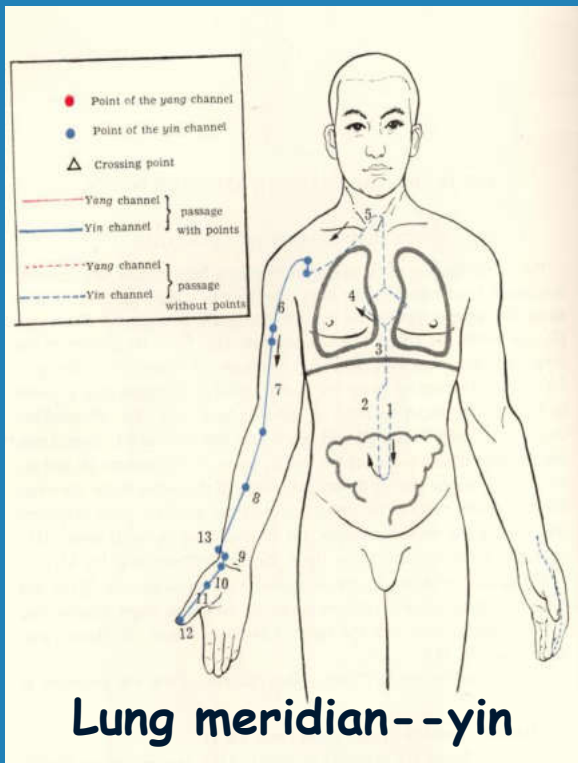
*Types of Qi:*

Origin: **Yuan Qi** (prenatal-parents),  
**Zong Qi** (postnatal-breathing),  
**Ying Qi** (nourishing Qi-food)  
**Wei Qi** (defending Qi-food)

Structure: **Zang-Fu Qi** (Qi of internal organ)  
**Meridian Qi**

*Function of Qi:* Promoting, defending, warming,  
consolidating and governing, “Qi Hua” (metabolizing  
and transforming)

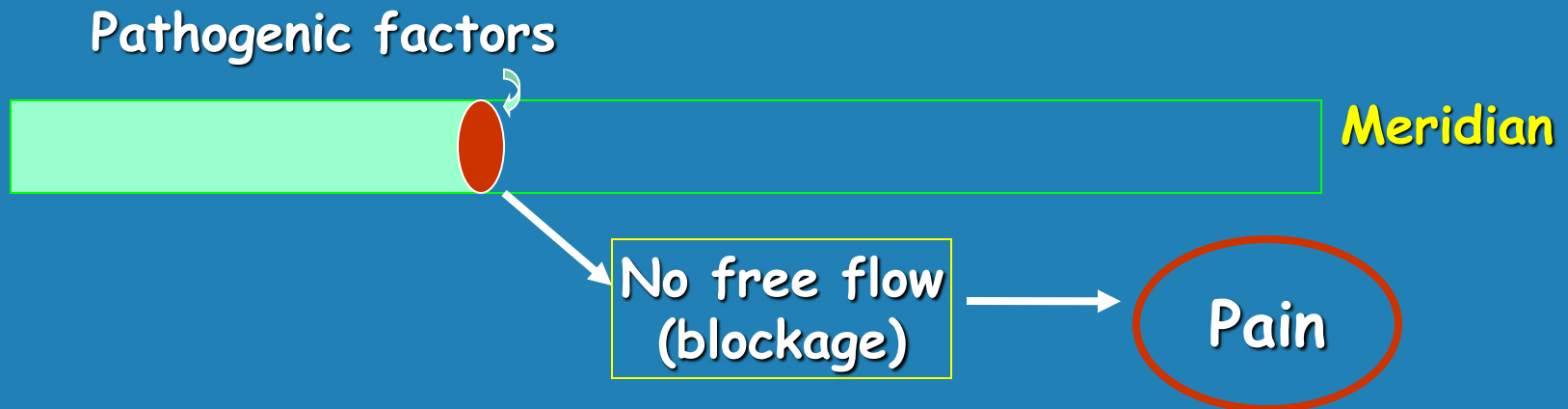
# Meridian Systems--Pathways for "Qi" Flow & Links of All Systems



- 14 regular meridians
- All acupoints distribute along meridians
- Bridge in and out of the body
- Reflect pathophysiology of the inside.
- Guide the treatment

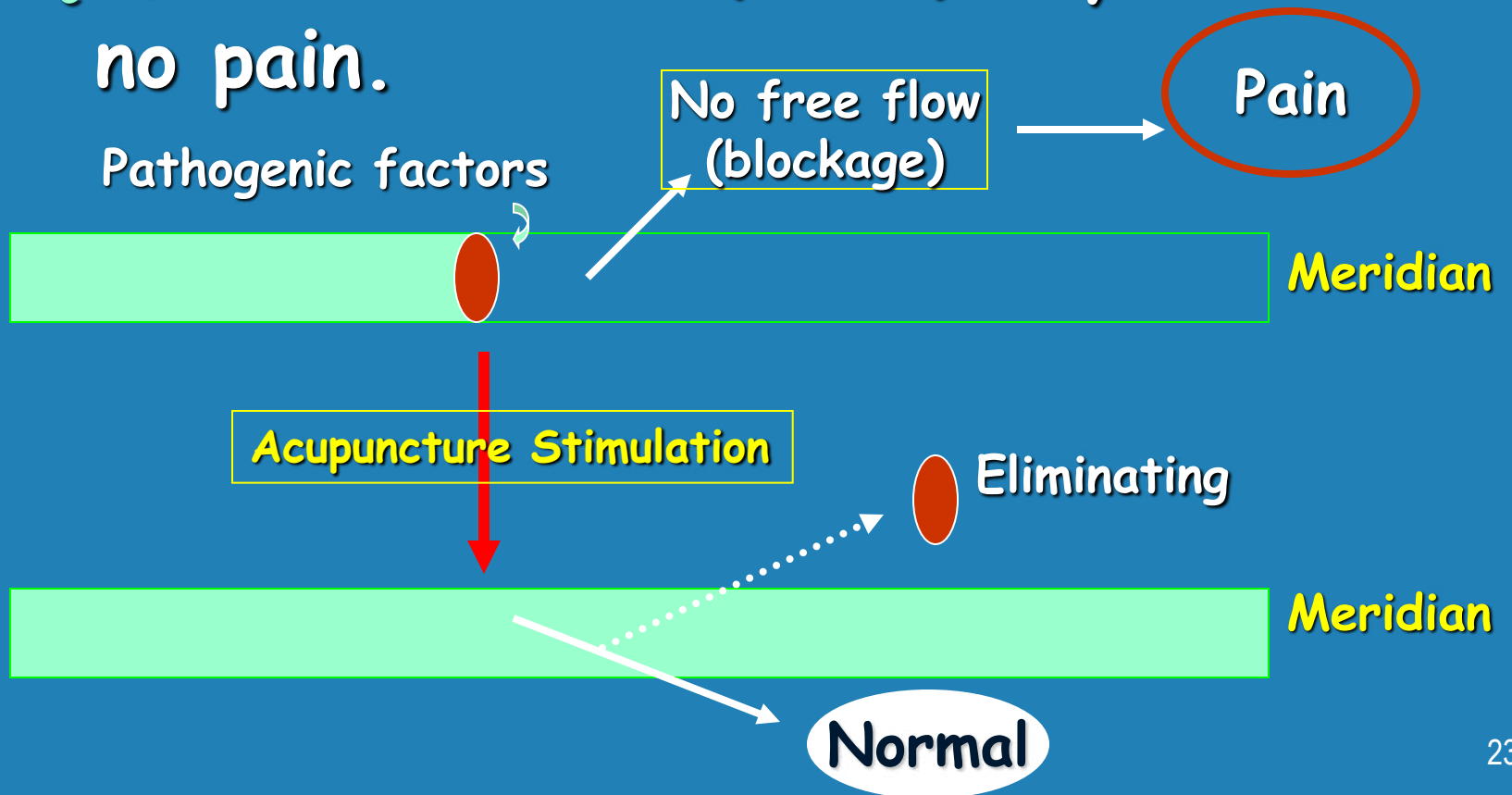
# Meridians

∞ Where there is no free flow (blockage), there is pain.



# Meridians

Ω Where there is free flow, there is no pain.





# Zang-Fu (脏腑) -- Internal Organs

Functional systems, not pure anatomical ones

**Five Zang**  
(Yin organs)

**Liver (Gan )**

**Heart (Xin )**

**Spleen (Pi )**

**Lungs (Fei )**

**Kidneys (Shen)**

**Six Fu**  
(Yang organs)

**Gallbladder**

**Small intestine**

**Stomach**

**Large intestine**

**Bladder**

**Three warmers**

**Extraordinary**  
**Organs**

**Brian**

**Medulla**

**Bone**

**Vessel**

**Gallbladder**

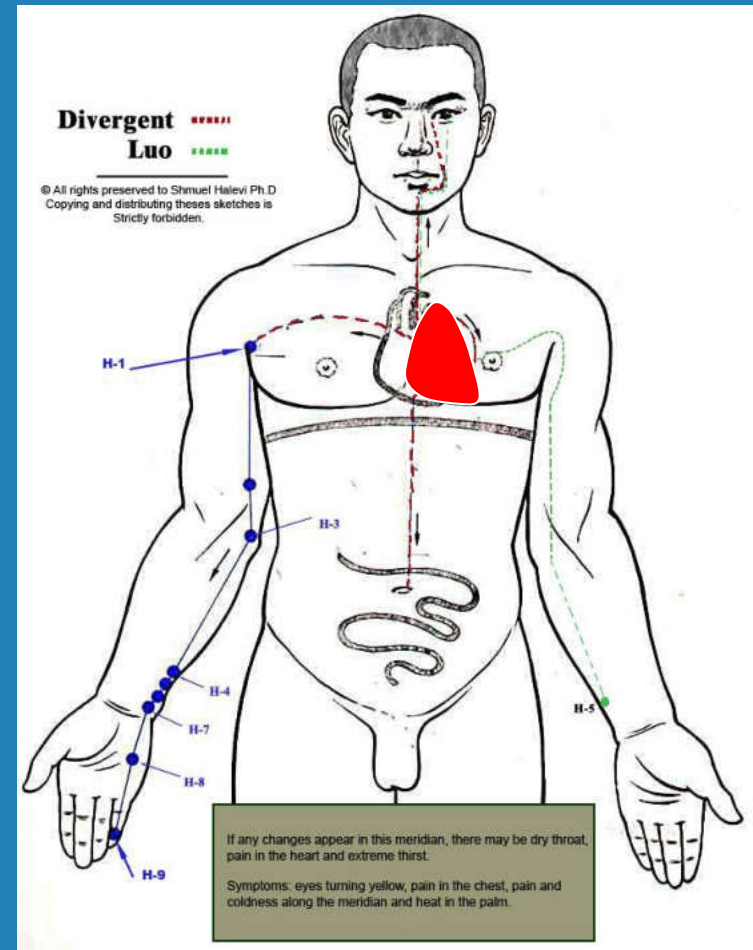
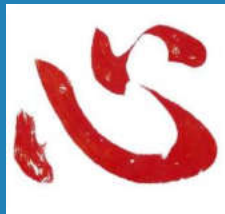
**Uterus**

**Mind-body connection**

# Heart (心):

## The monarch of all organs

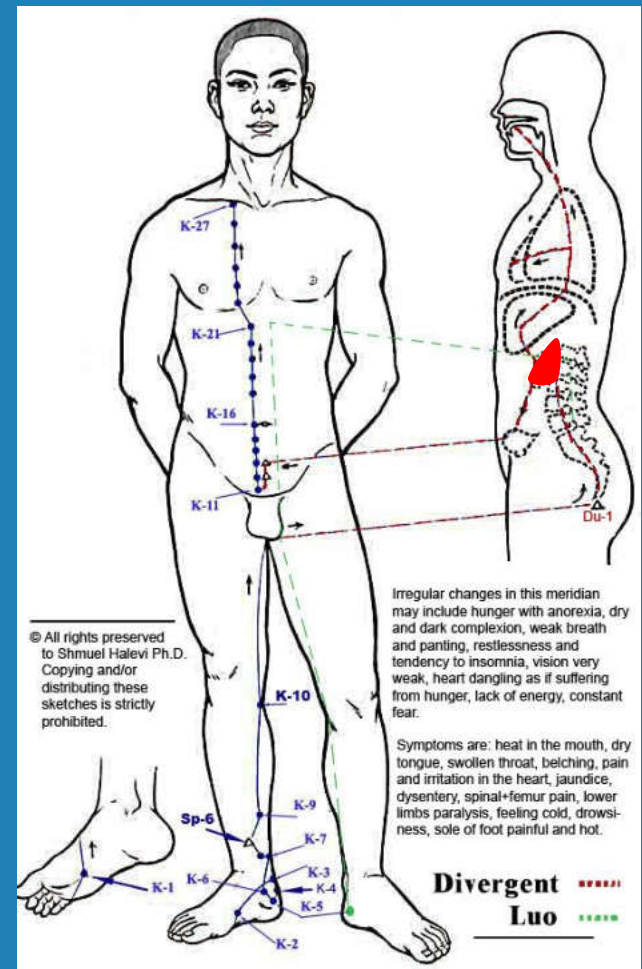
- Controls blood and vessels
- Houses mind and governs mental activity
- Controls sweat
- Opens into tongue
- Manifests in complexion



# Kidneys (肾):

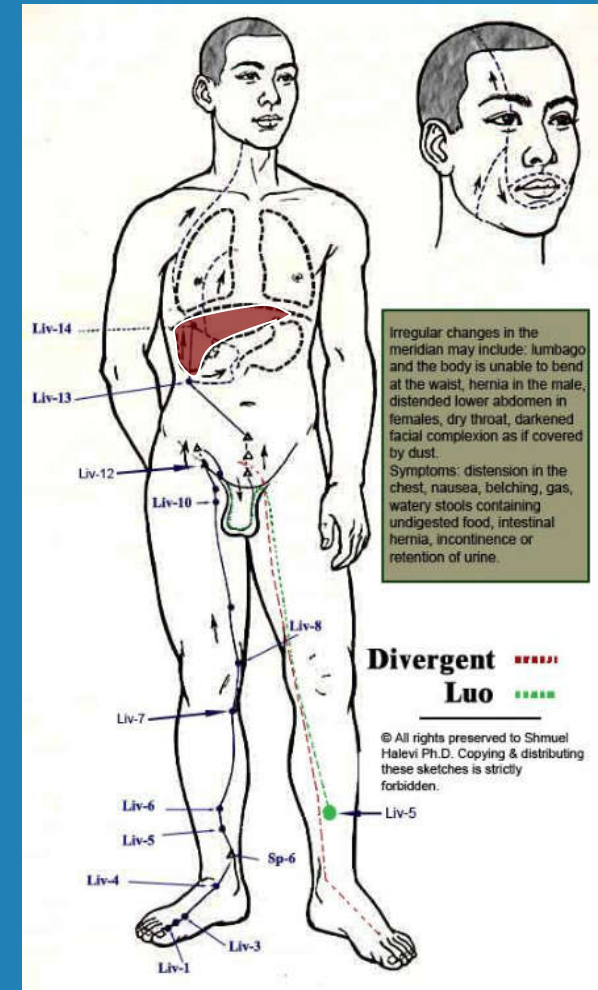
## Root of life, Root of Yuan Qi

- Store Essence and govern birth, growth, reproduction and development
- Produce marrow, fill up brain and control bones
- Govern water
- Control reception of Qi
- **House Will power,**
- Open into ears and manifest in hair

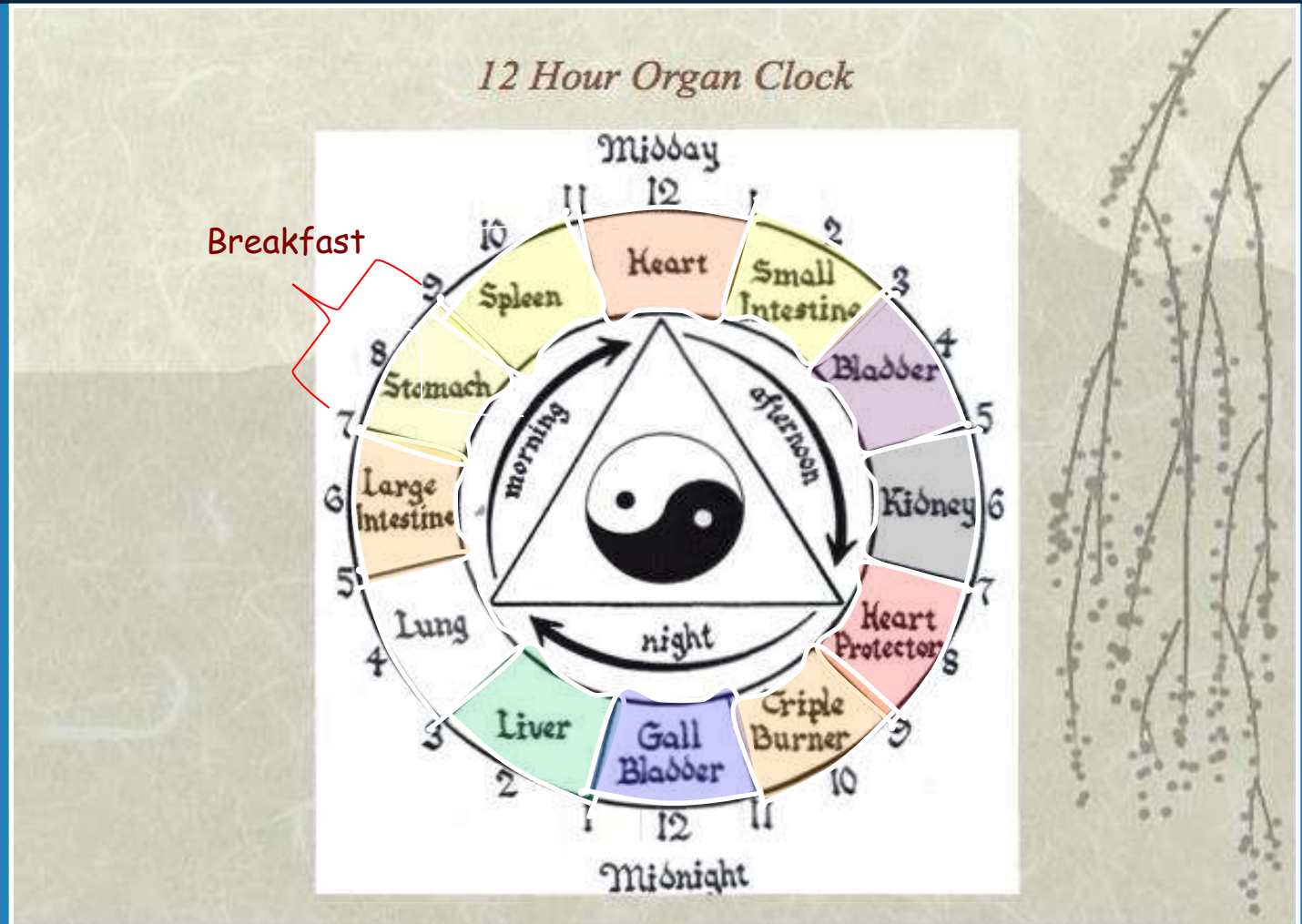


# Liver(肝): The general of organs from whom the strategy is derived

- Stores blood,
- Ensures smooth flow of Qi and blood
- Houses Ethereal Soul
- **Regulating mind and mood**
- Promoting digestion and absorption
- Controls sinew
- Opens into eyes
- Manifests in nails.

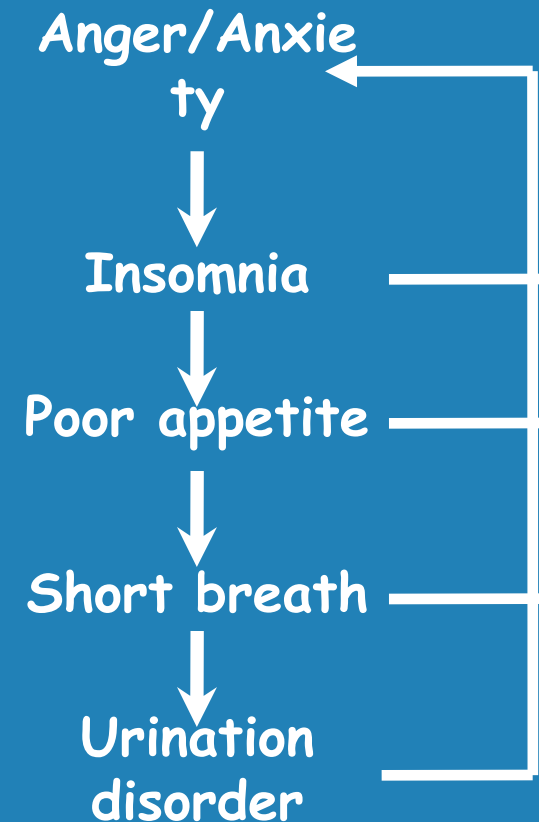
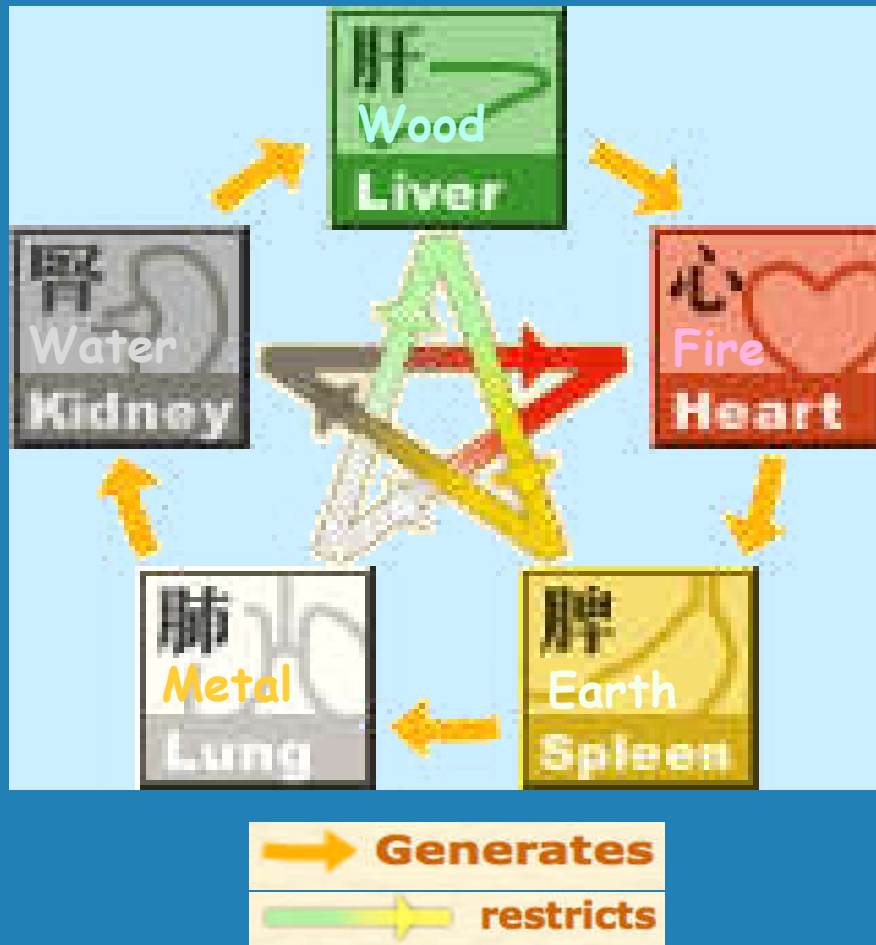


# Peak time for each organ





# Five Elements



# Five Elements



	Wood	Fire	Earth	Metal	Water
Yin Organ	Liver	Heart	Spleen	Lung	Kidney
Yang Organ	Gall Bladder	Small Intestine	Stomach	Large Intestine	Bladder
Emotions	Anger	Joy	Pensiveness	Grief	Fear
Taste	Sour	Bitter	Sweet	Pungent	Salty
Season	Spring	Summer	Late Summer	Autumn	Winter

# Acupuncture: What Conditions Commonly Treated

- Health maintenance and promotion
- Prevention—boost immune function, anti-aging, anti-oxidation...
- Complement to western medicine
- Therapeutic—
  - Chronic pain (headaches, joints, back, neck, sciatica, TGN, TMJ, arthritis pain...)
  - Emotional/mental conditions (stress, anxiety, depression, insomnia)
  - PMS, dysmenorrhea; menopausal syndromes; fertility
  - GI dysfunction
  - Cardiovascular conditions
  - Respiratory ailment (sinus allergy, asthma)
  - immunological/endocrinological conditions
- Others—sport injury, military use, cosmetic

# Acupuncture: What Conditions Commonly Treated

WHO: recognizes acupuncture's common use in treating over 100 conditions.

*Acupuncture: review and analysis of reports on controlled clinical trials*

*(WHO:  
<http://www.who.int/iris/handle/10665/42414> ,  
2002 )*



**World Health  
Organization**



# Randomized controlled trial studies

ClinicalTrials.gov

A service of the U.S. National Institutes of Health

Example: "Heart attack" AND "Los Angeles"

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527 studies found for: acupuncture

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**Completed** [Efficacy of Acupuncture in the Treatment of Fibromyalgia](#)

**Condition:** Fibromyalgia

**Intervention:** Procedure: Acupuncture

**Funder Type:** NIH

**Study Completion:** July 2002

**First Received:** February 2, 2001

**Completed** [Acupuncture in the Treatment of Depression](#)

**Conditions:** Depressive Disorders; Depression

**Intervention:** Procedure: Acupuncture

**Funder Type:** NIH

**Study Completion:** April 2002

**First Received:** February 2, 2001

**Completed** [Randomized Controlled Trial of Acupuncture for Dysmenorrhea](#)

**Condition:** Dysmenorrhea

**Interventions:** Procedure: acupuncture; Procedure: usual care

**Recruiting** [Acupuncture for the Treatment of Insomnia](#)

**Condition:** Primary Insomnia

**Intervention:** Other: Acupuncture

**Funder Type:** Other / NIH

**Study Completion:** February 2013

**First Received:** March 2, 2009

**Recruiting** [Acupuncture in Menopause](#)

**Condition:** Vasomotor Symptoms

**Intervention:** Procedure: Acupuncture

**Funder Type:** Other / NIH

**Study Completion:**

**First Received:** January 11, 2011

**Recruiting** [Brain Mechanisms of Acupuncture Treatment in Chronic Low Back Pain](#)

**Conditions:** Chronic Low Back Pain; Low Back Pain; Back Pain

**Intervention:** Procedure: Acupuncture

**Funder Type:** Other / NIH

**Study Completion:** December 2016

**First Received:** May 8, 2012

# Individualized Treatment with Acupuncture/TCM



## Insomnia

### YIN

**Patterns:** Heart/Spleen deficiency

**Symptoms:** Excessive dream, hard to stay asleep, fatigue, poor memory, dizziness, pale tongue with thin coating, fine and weak pulse

**Treatment:** Replenish heart and spleen    Promote liver qi

**Patterns:** Yin deficiency

**Symptoms:** Excessive dream, hard to stay asleep, fatigue, poor memory, dizziness, red tongue, weak thin pulse

**Treatment:** replenish Yin

### YANG

Liver-qi stagnation

Excessive dream, hard to fall asleep, irritation, bitter taste, headache, impatience, red tongue with yellow coating, string-pulse

Liver-fire

Excessive dream, hard to fall asleep, irritation, bitter taste, headache, impatience, thin/yellow, coating, rapid string-like pulse

Clear up liver fire

# How Does Acupuncture Work?

## From TCM perspective:

- Unblock meridian
- Enhance "Qi"
- Modulate "Zang-Fu"
- Optimize "In" and "out"
- Balance "Yin-Yang"

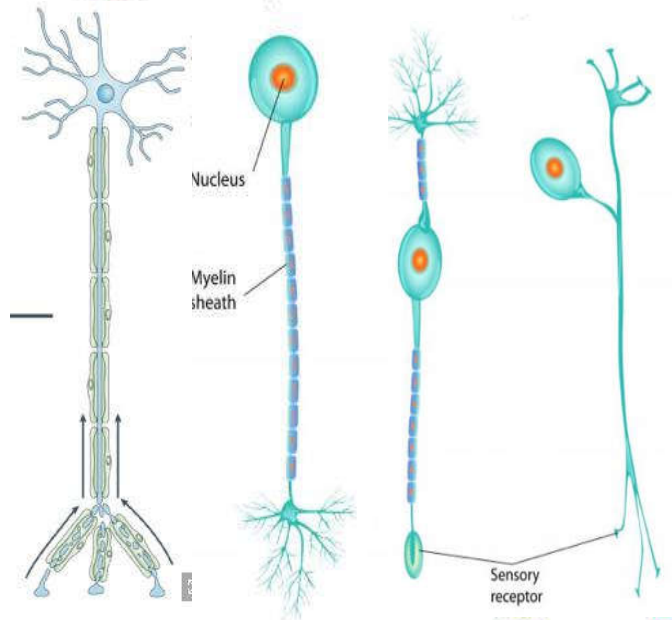
## From biomedical perspective:

- Improve local condition
- Regulate nervous system
- Modulate neurotransmission
- Enhance immune function
- Regulate endocrine activity
- And more...

# Overview of Acupuncture Action

## --Peripheral Nervous system

### Primary Afferent Axons

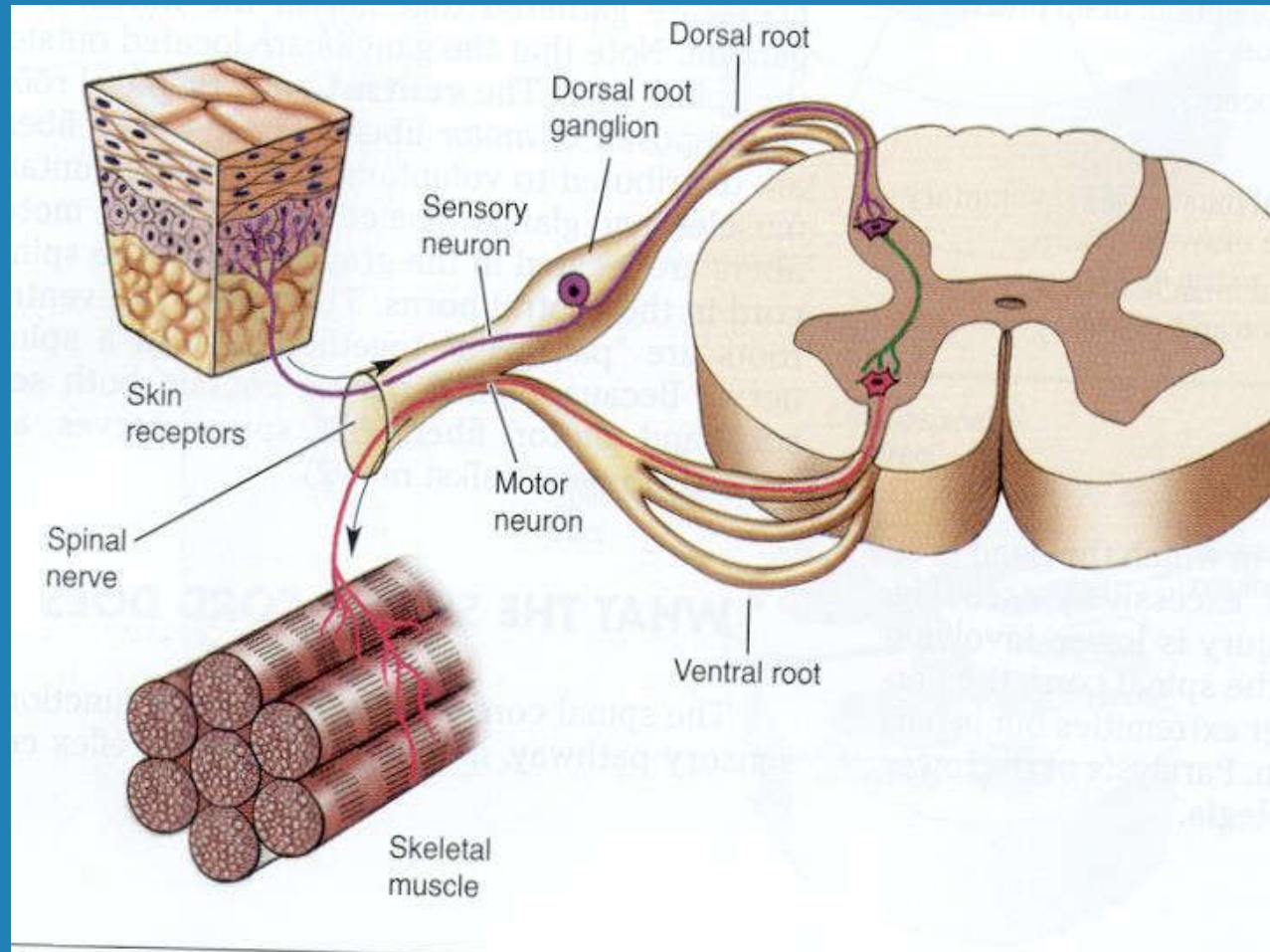


Axon Type	A $\alpha$	A $\beta$	A $\delta$	C
Diameter ( $\mu\text{m}$ )	13-20	6-12	1-5	.2-1.5
Speed (m/s)	80-120	35-75	5-35	.5-2.0

- **A-delta fibers** - smaller, fast transmitting, myelinated fibers that transmit sharp pain
  - Mechanoreceptors - Triggered by strong mechanical pressure and intense temperature
- **C-fibers** - smallest, slow transmitting unmyelinated nerve fibers that transmit dull or aching pain.
  - Mechanoreceptors - Mechanical & Thermal
  - Chemoreceptors - Triggered by chemicals released during inflammation
- **A-alpha/beta fibers** - large diameter, fast transmitting, myelinated sensory fibers



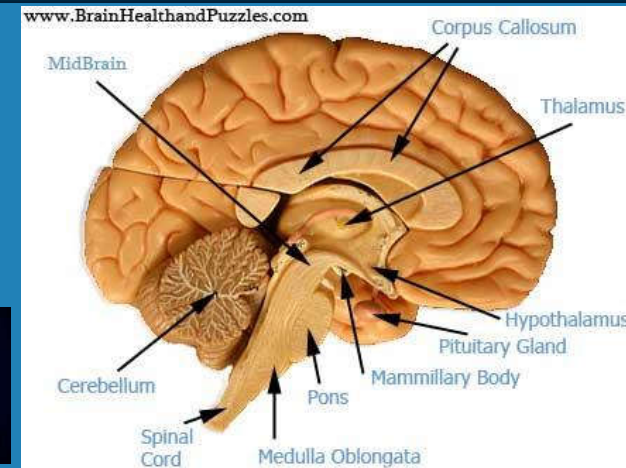
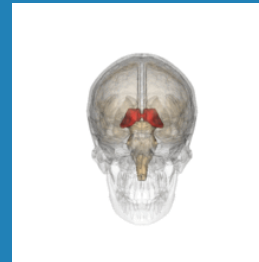
# Overview of Acupuncture Action --Central Nervous system



# Overview of Acupuncture Action --Central Nervous system

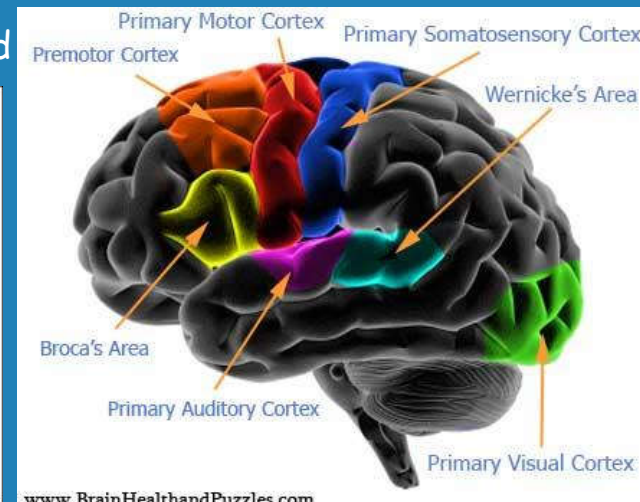
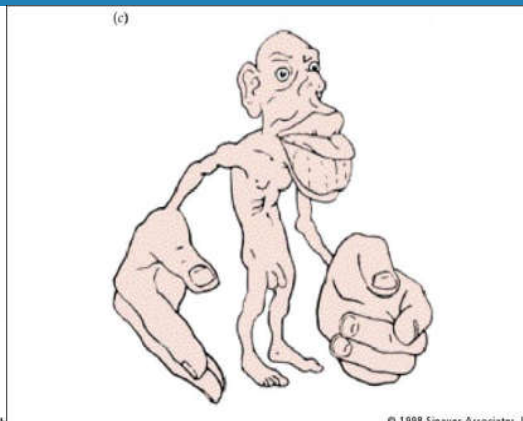
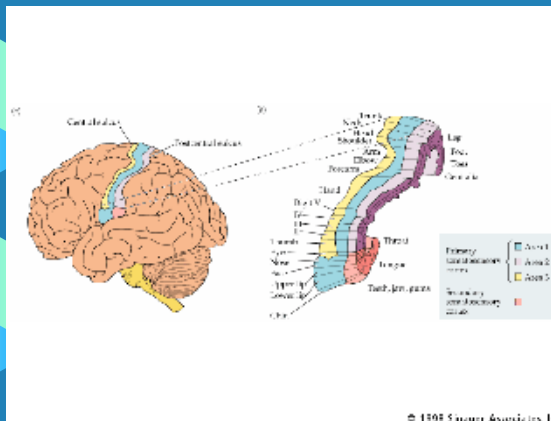
## Thalamus:

- The sensory switchboard of the brain
- Located in the middle of the brain



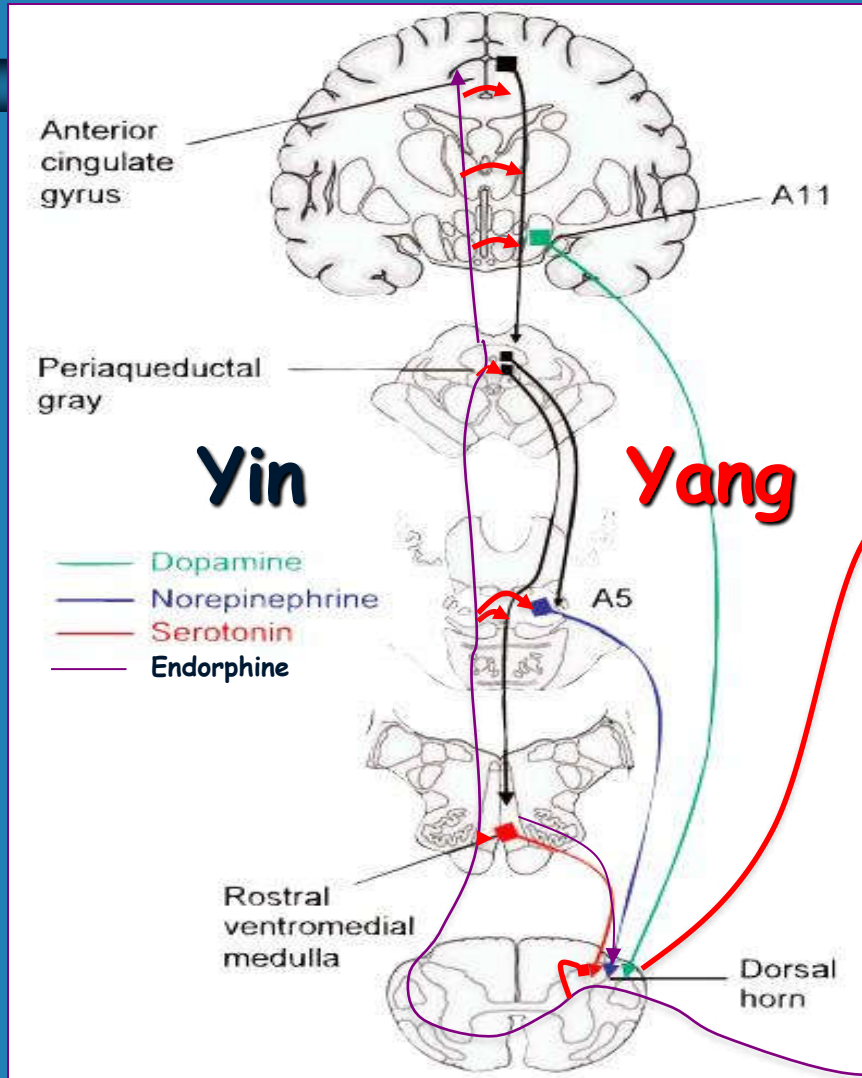
## Somatosensory Cortex:








Receives all info on touch and pain. Somatotopically organized



# Overview of Acupuncture Action

Yin — Yang



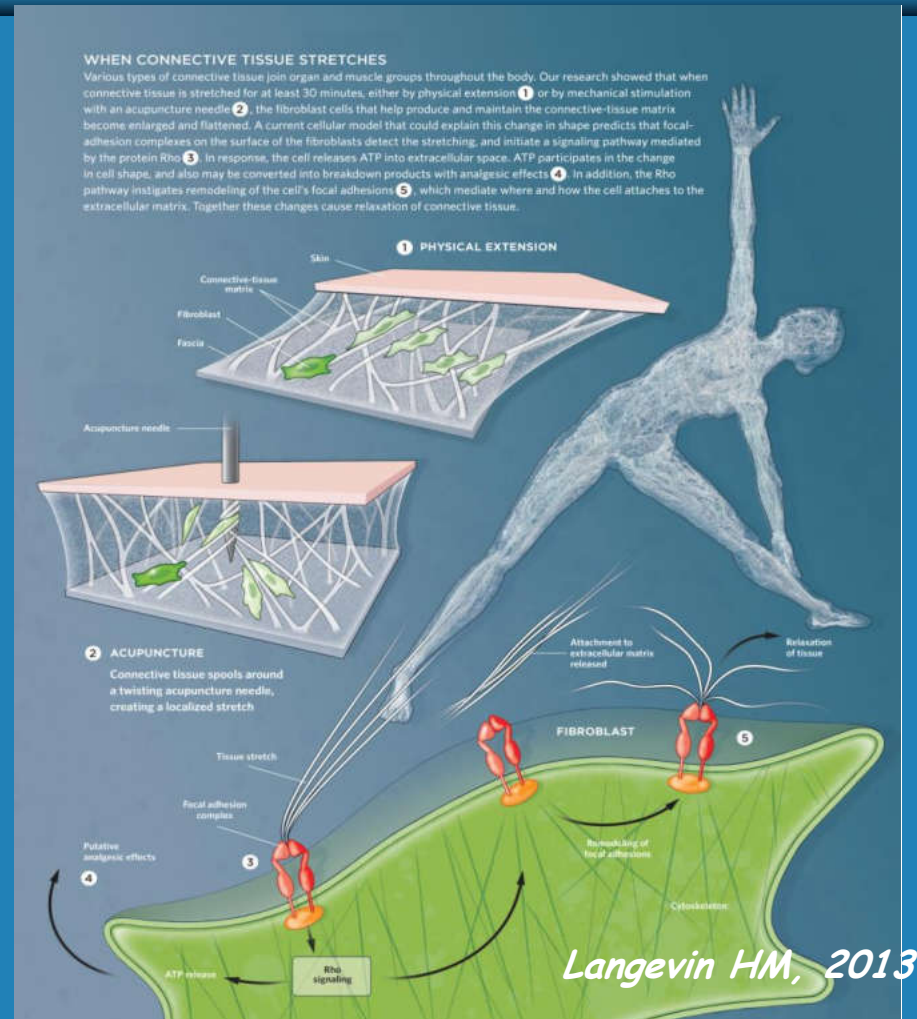
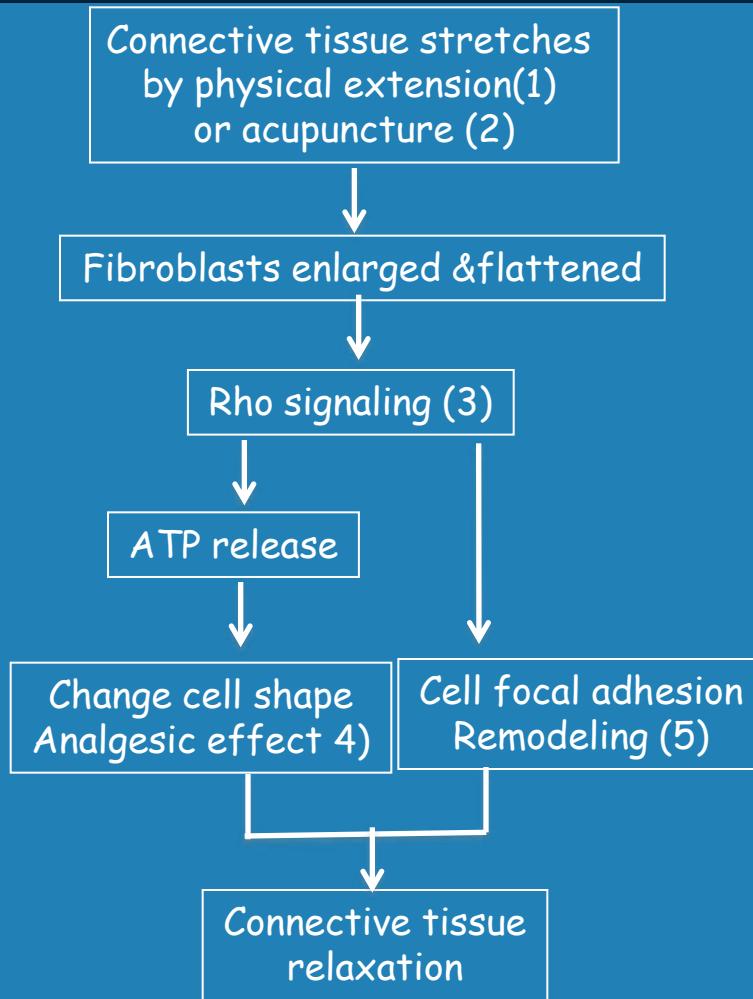
-  Soft tissues
-  nerves  
Glands
-  Heart & vessels
-  lungs
-  liver
-  Kidney/bladder
-  GI



Acupuncture

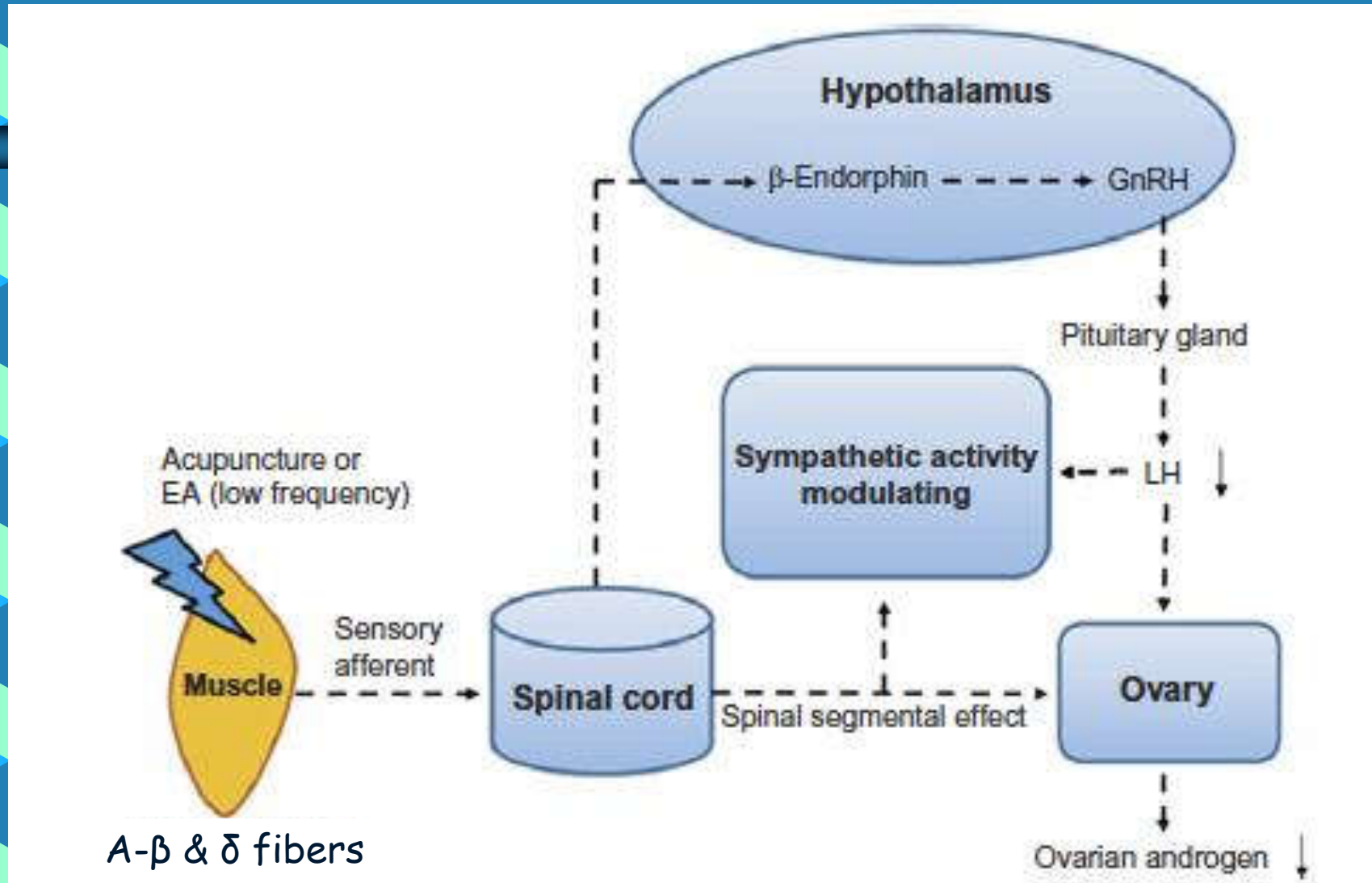


# At the tip of a needle—local improvement

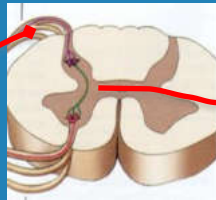




# Acupuncture modulation on HPO/HPA axis



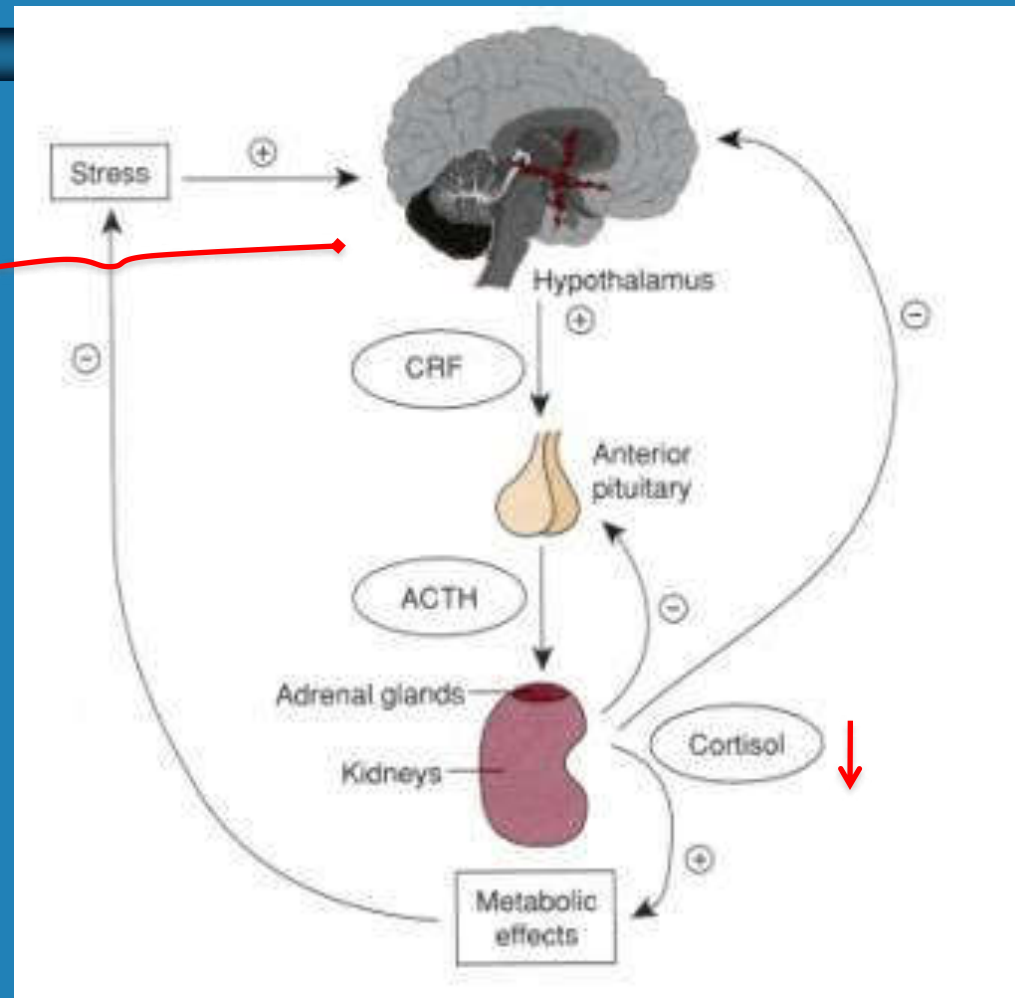
# Acupuncture modulation on HPA axis



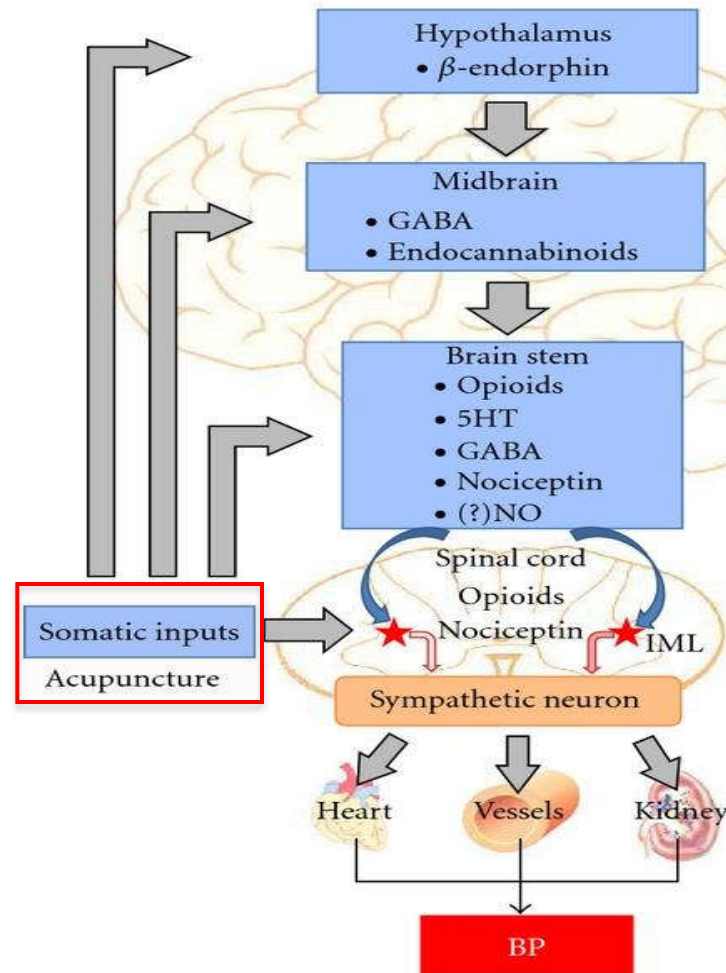
Spinal Cord



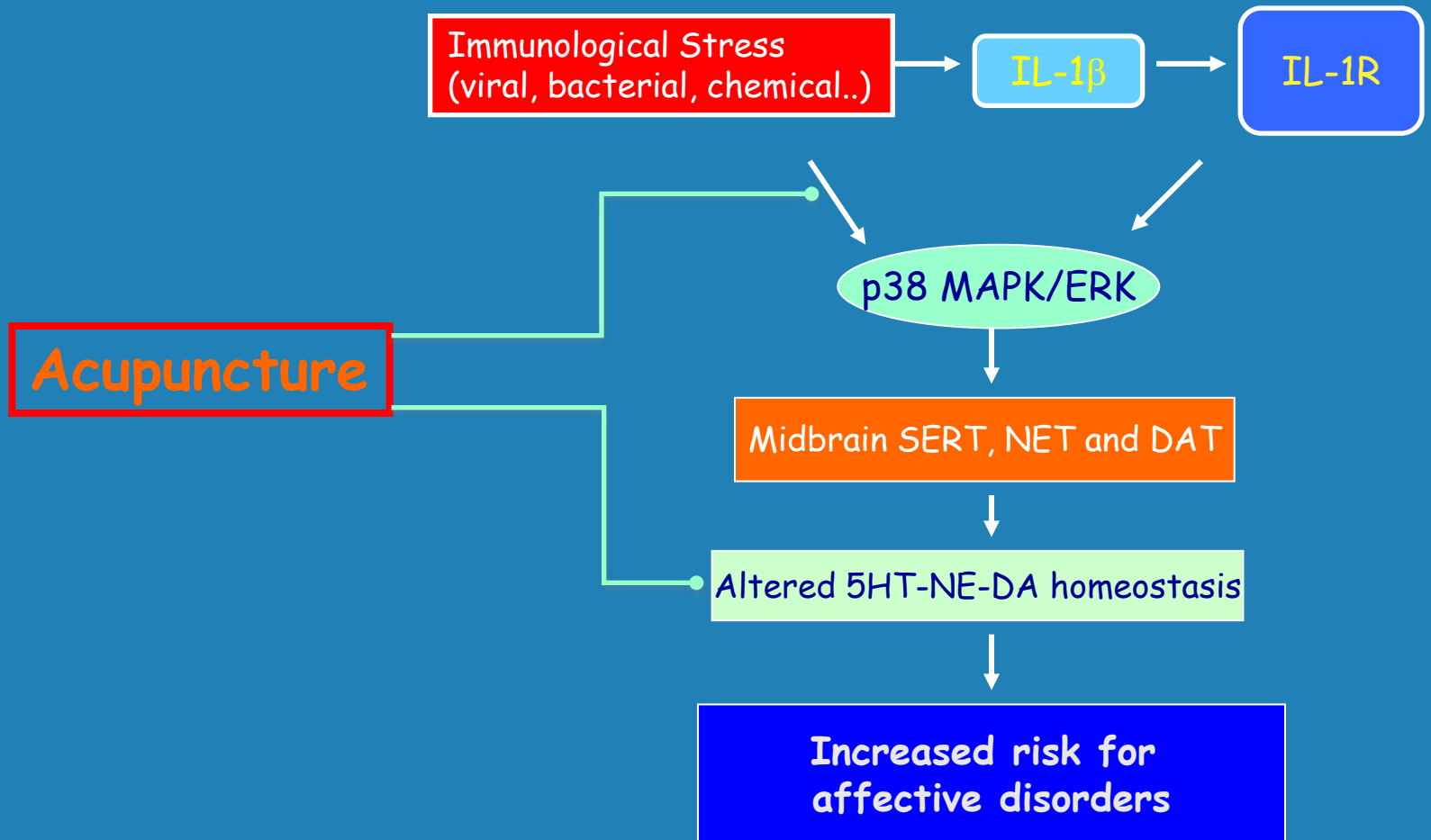
Acupuncture  
A- $\beta$  &  $\delta$  fibers



# Neuroendocrine modulation of blood pressure by acupuncture



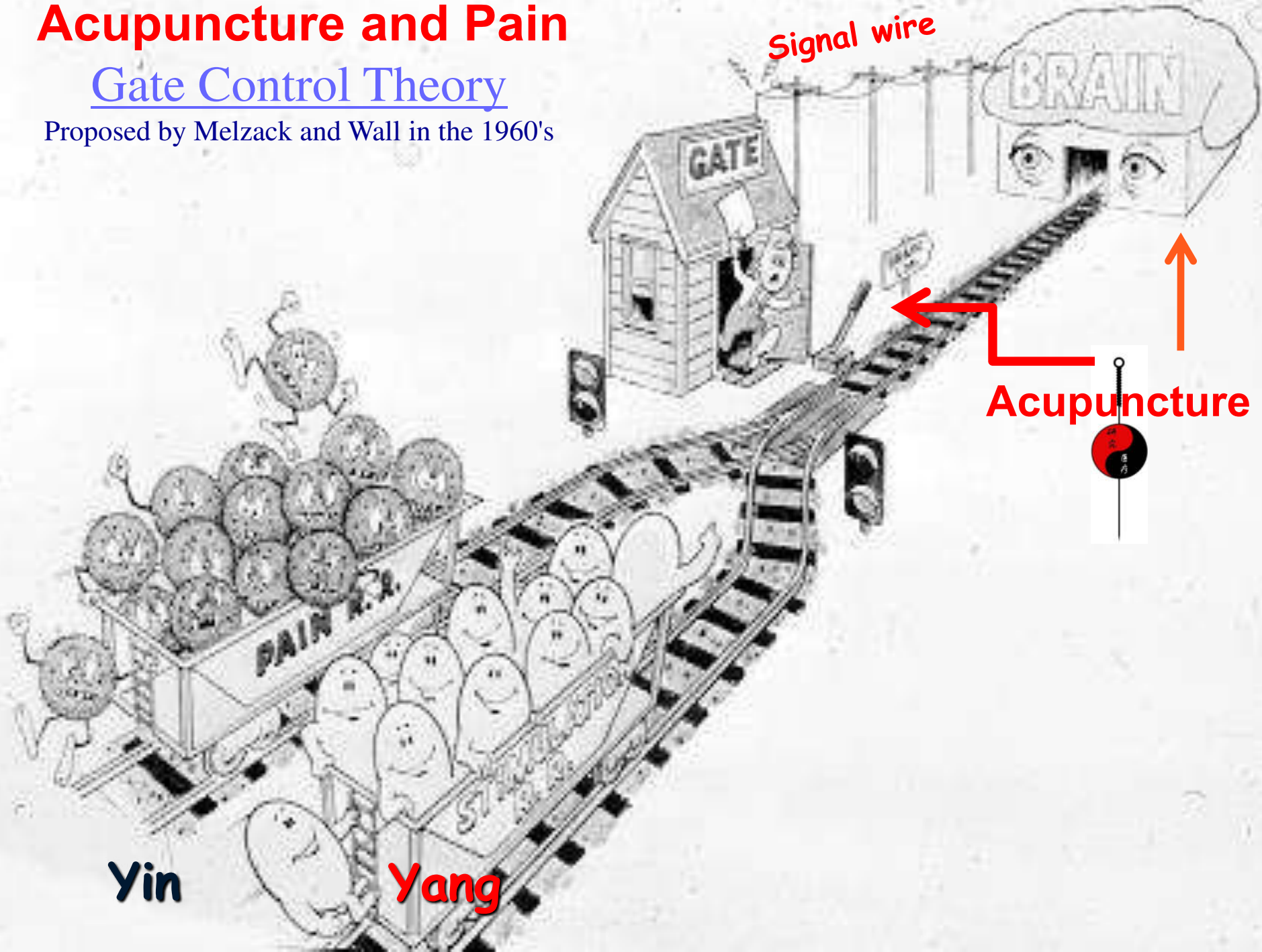
# Acupuncture modulation on affective disorder via immune system and central 5HT, NE and DA



# Acupuncture and Pain

## Gate Control Theory

Proposed by Melzack and Wall in the 1960's

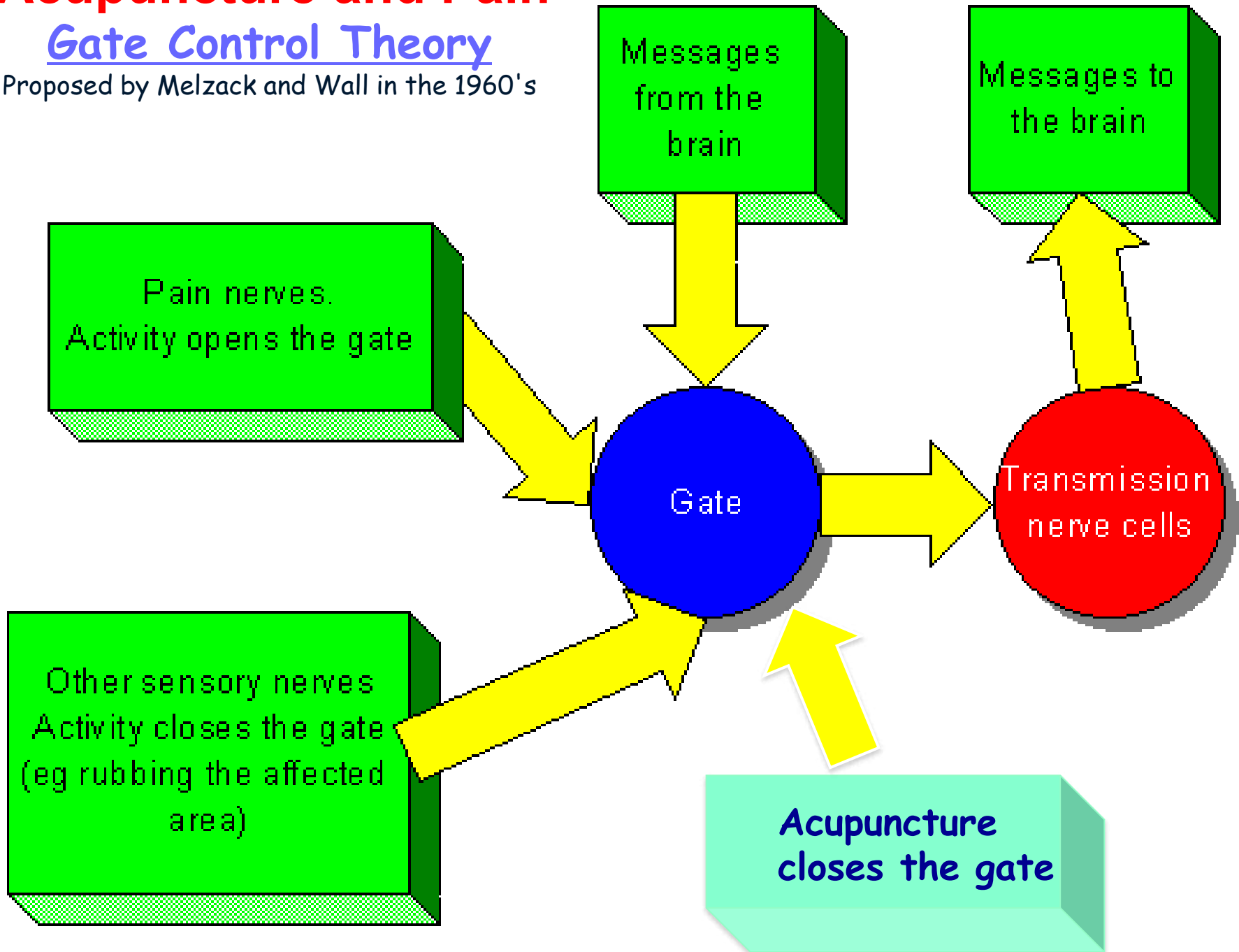




# Acupuncture and Pain

## Gate Control Theory

Proposed by Melzack and Wall in the 1960's



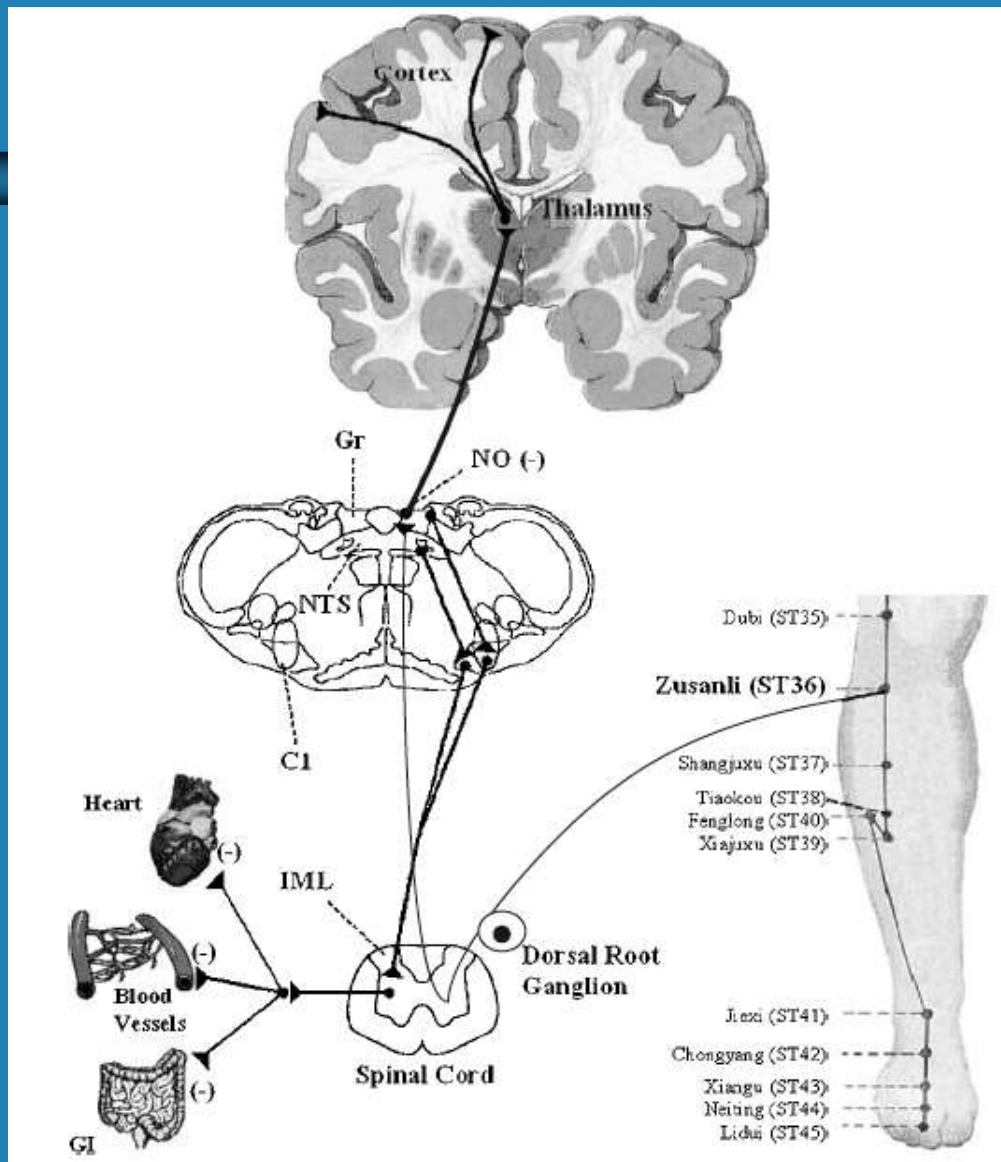
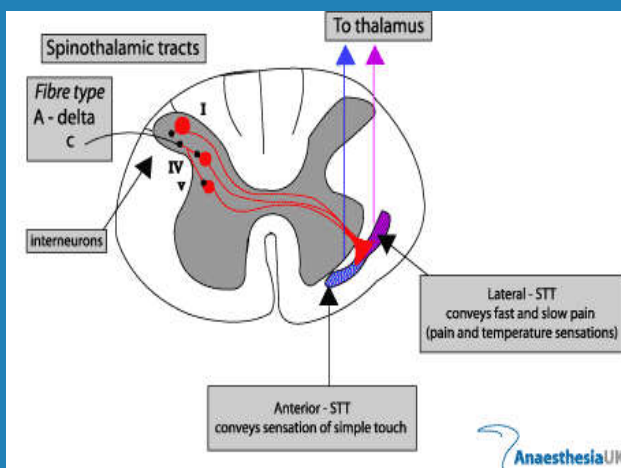
# Conditions that open or close the gate

	Conditions that open the gate	Conditions that close the gate
<b>Physical conditions</b>	Extent of the injury	Medication
	Inappropriate activity level	Counter stimulation, eg <i>Acupuncture, massage</i>
<b>Emotional Conditions</b>	Anxiety or worry	Positive emotions
	<b>Tension</b>	Relaxation
	Depression	Rest
<b>Mental conditions</b>	Focusing on the pain	Intense concentration or distraction (meditation)
	Boredom	Involvement and interest in life activities

# Acupuncture and Pain

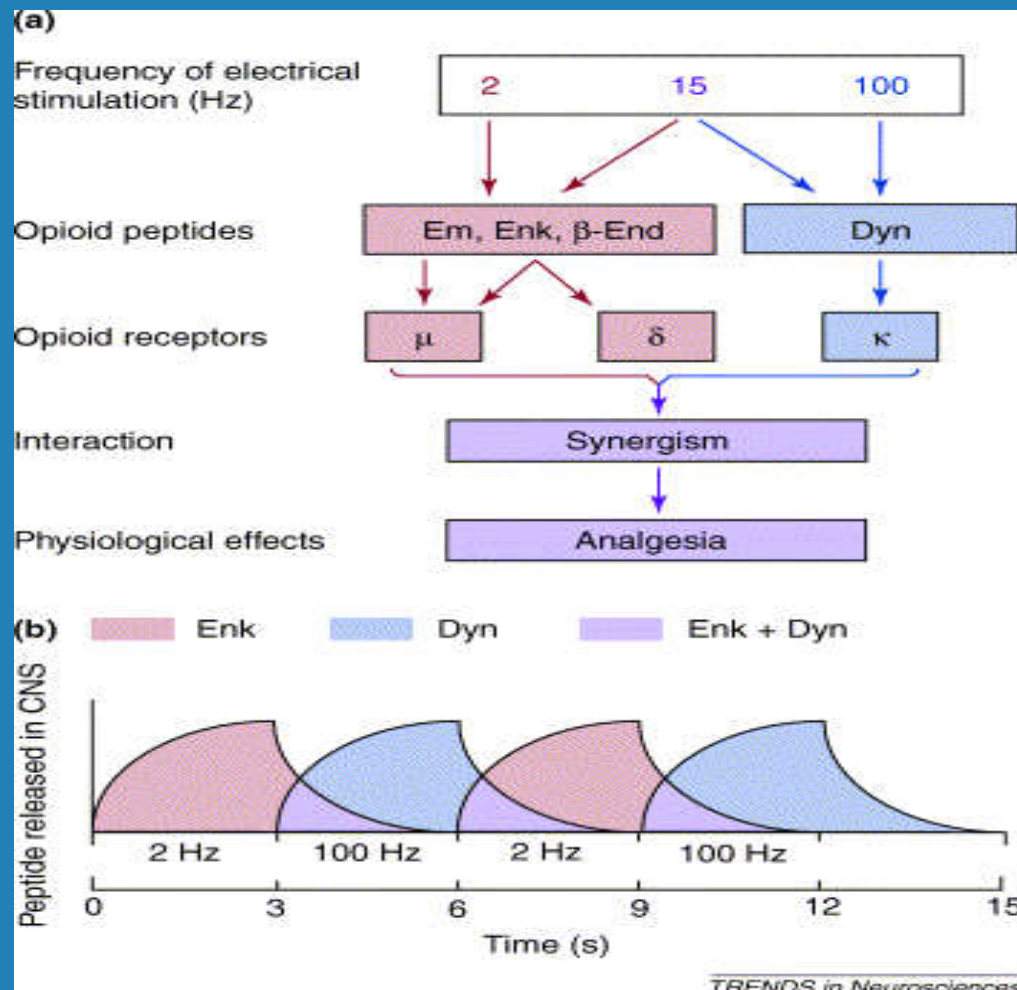
## Molecules involved:

- endogenous opioid
- CCK
- 5-HT
- DA
- NE
- IL-1
- GABA
- ...



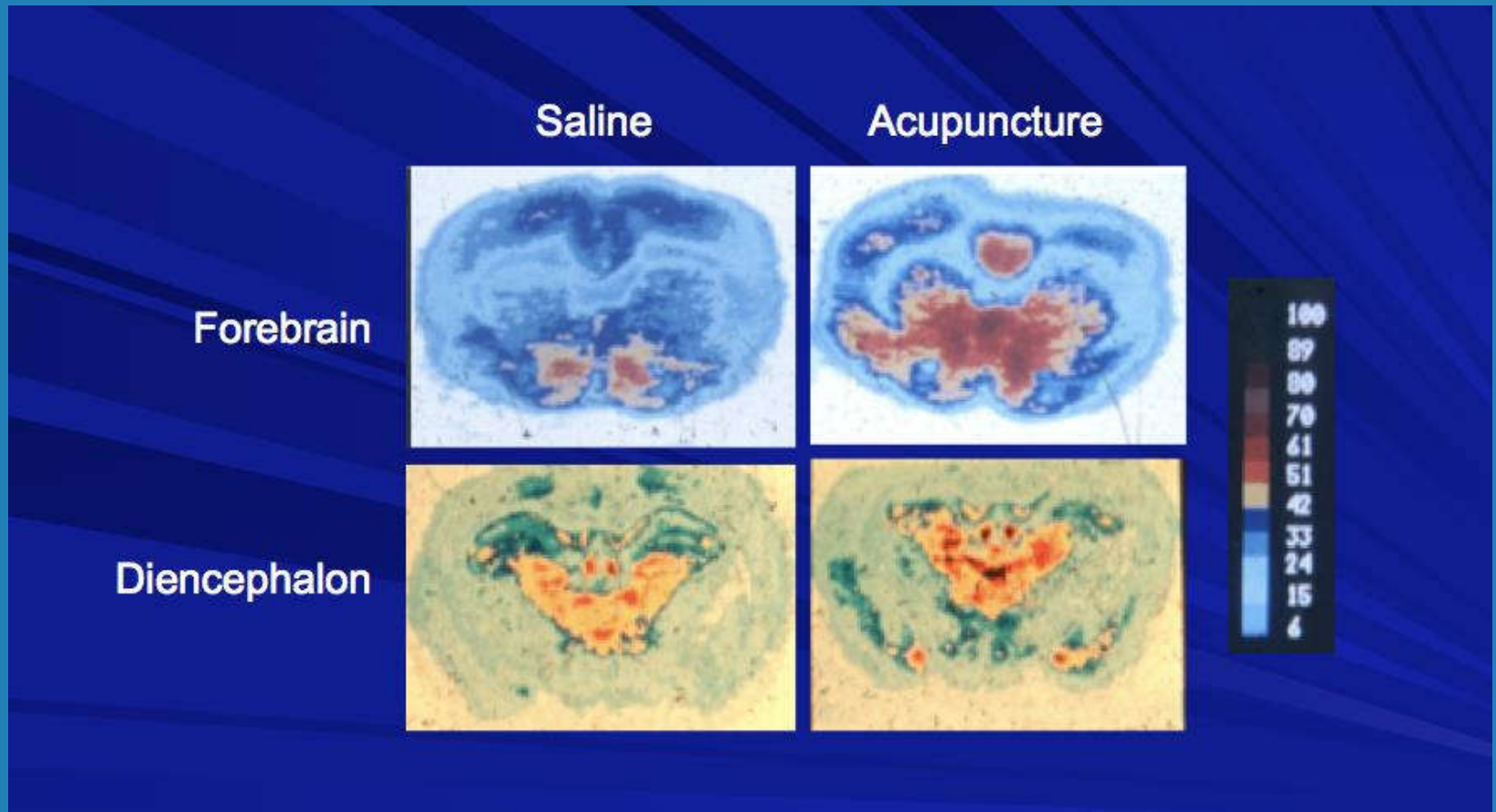
# Acupuncture and Pain

## Opioidergic Mechanisms for Analgesic Effect of Acupuncture



# Acupuncture and Pain

## Acupuncture up-regulates opioid receptor



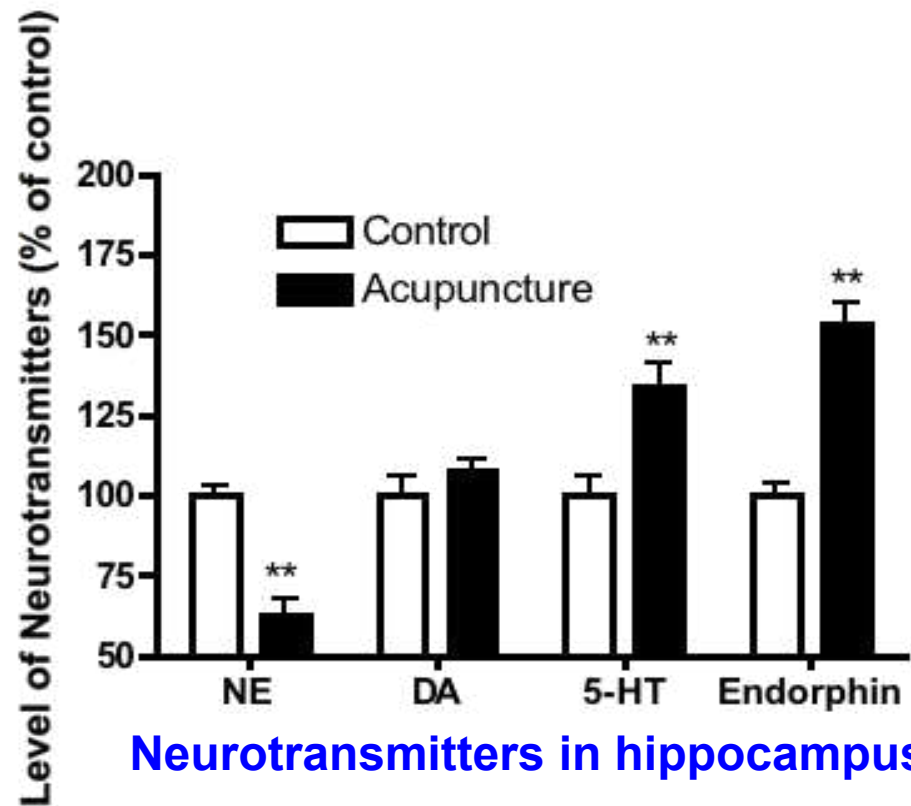


# Acupuncture Analgesia

- Enkephalins & Dynorphins ☒ Spinal Cord (Substantia Gelatinosa)
- Endorphins ☒ Brainstem (Periaqueductal Gray Matter)
- 5HT ☒ Brainstem (Raphe Nuclei)

# Acupuncture and Pain

## Effect of Acupuncture on Brain Neurotransmitters

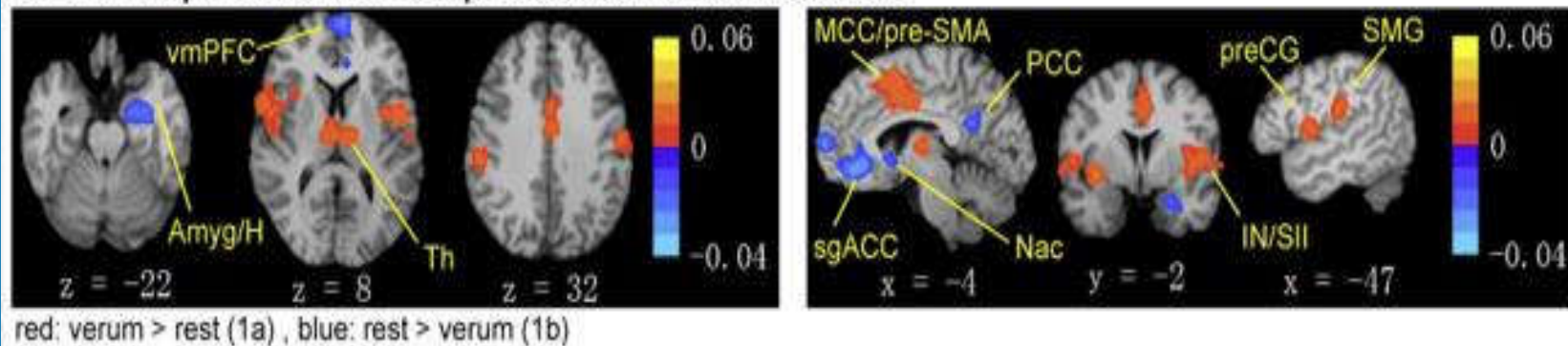


*Zhu CB, 1995*

# Imaging Studies on Acupuncture

## Systematic review and meta-analysis

A. Brain response to verum acupuncture stimuli relative to rest

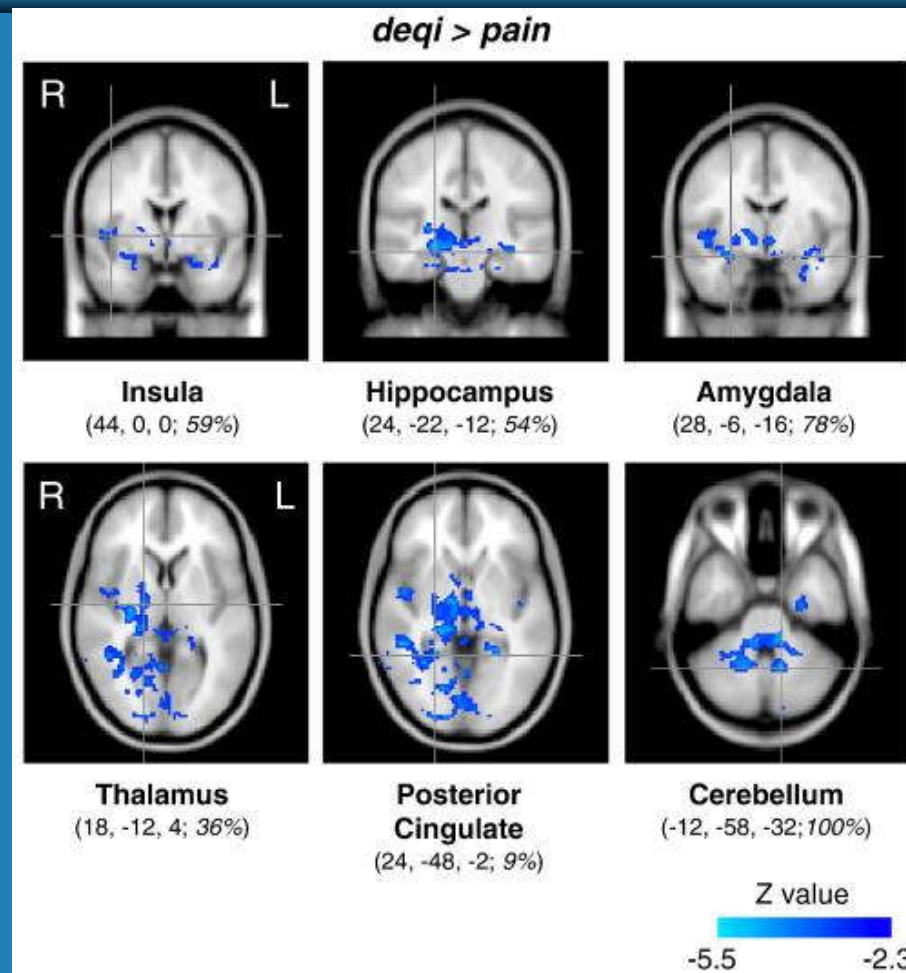


**Activation: information processing and control centers**--  
supramarginal gyrus (language center), SII, pre-supplementary  
motor area (pre-SMA), middle cingulate gyrus, insula, thalamus,  
precentral gyrus

**Deactivation: limbic system**—amygdala, hippocampus, vmPFC,  
posterior cingulate cortex (PCC).

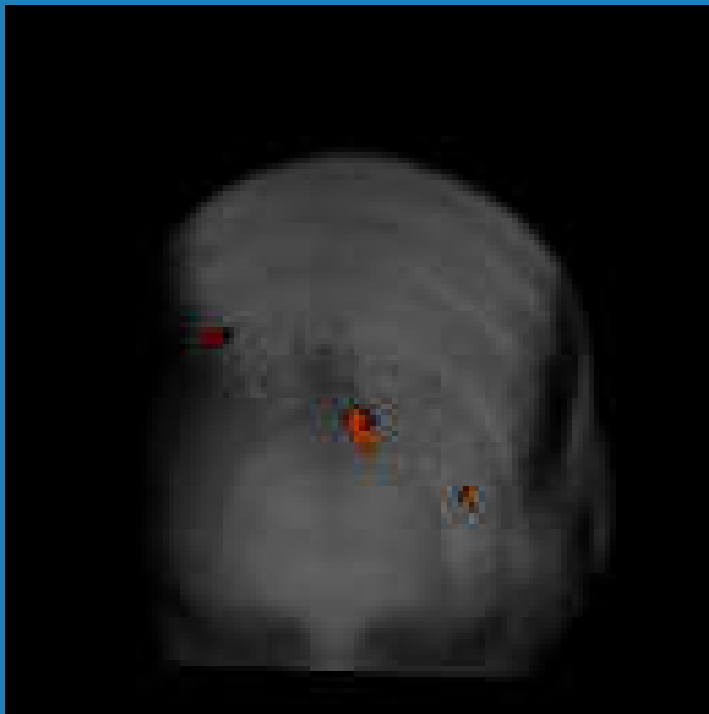
# Imaging Studies on Acupuncture

## "Deqi" deactivation of brain

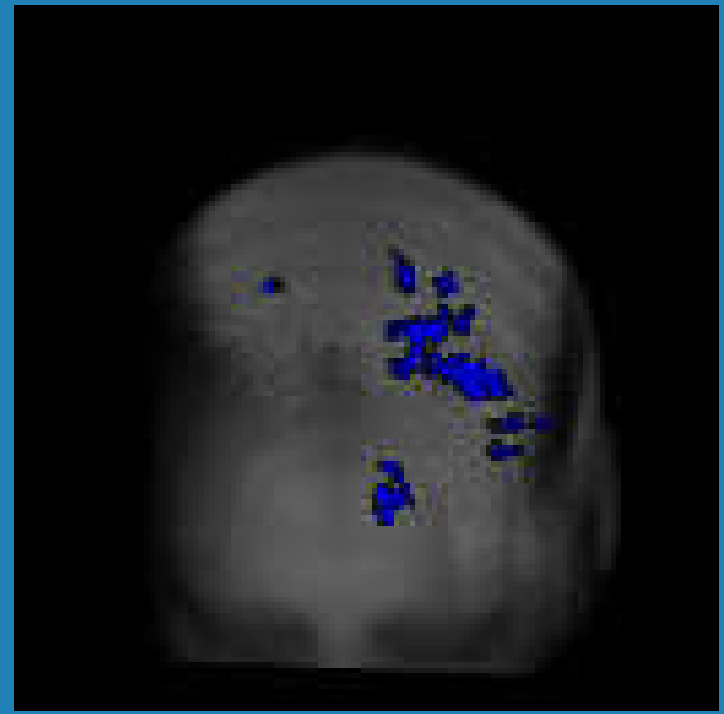


# Imaging Studies on Acupuncture

## Activation on Deqi



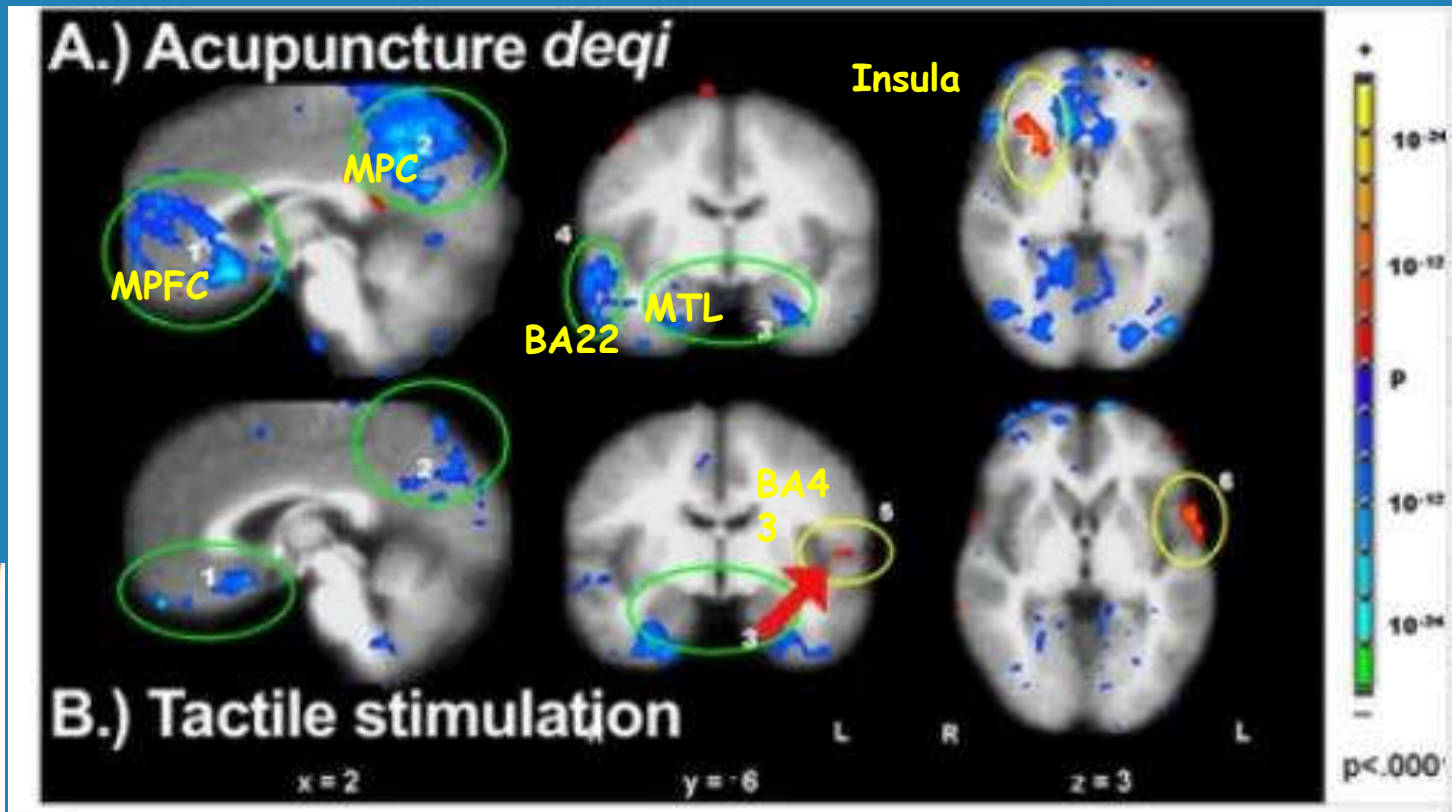
## Deactivation on Deqi





# Imaging Studies on Acupuncture

## "Deqi" deactivation of brain

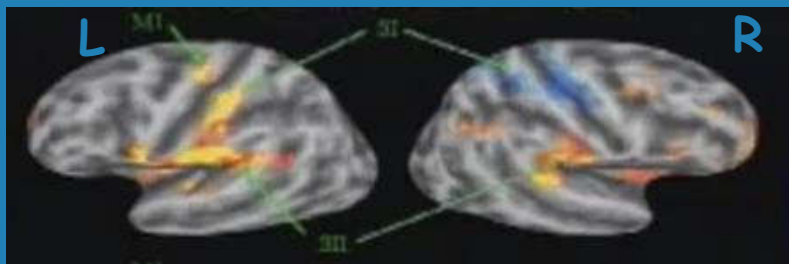


Acupoint (Liv3)

Hui KS, Napadow V, Kwong K et al. 2010, JOVE  
Monitoring Acupuncture Effects on Human Brain by fMRI

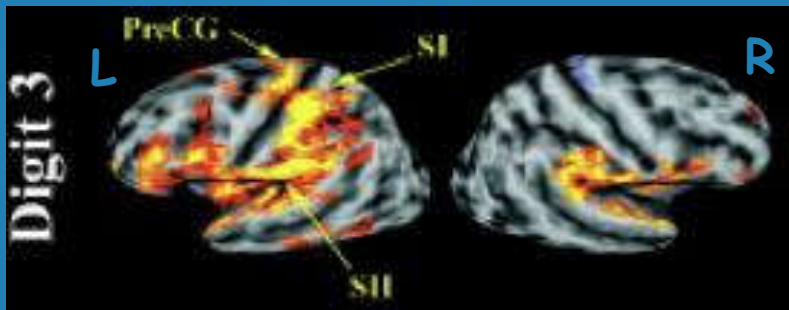
# Imaging Studies on Acupuncture

carpal tunnel syndrome (CTS) treated by acupuncture

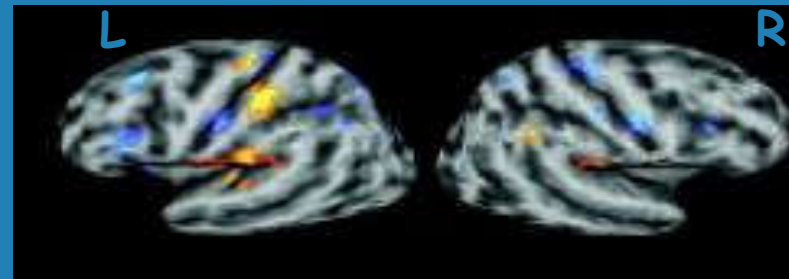


Healthy control

*Napadow, V, et al., Neuroimaging, 2005*

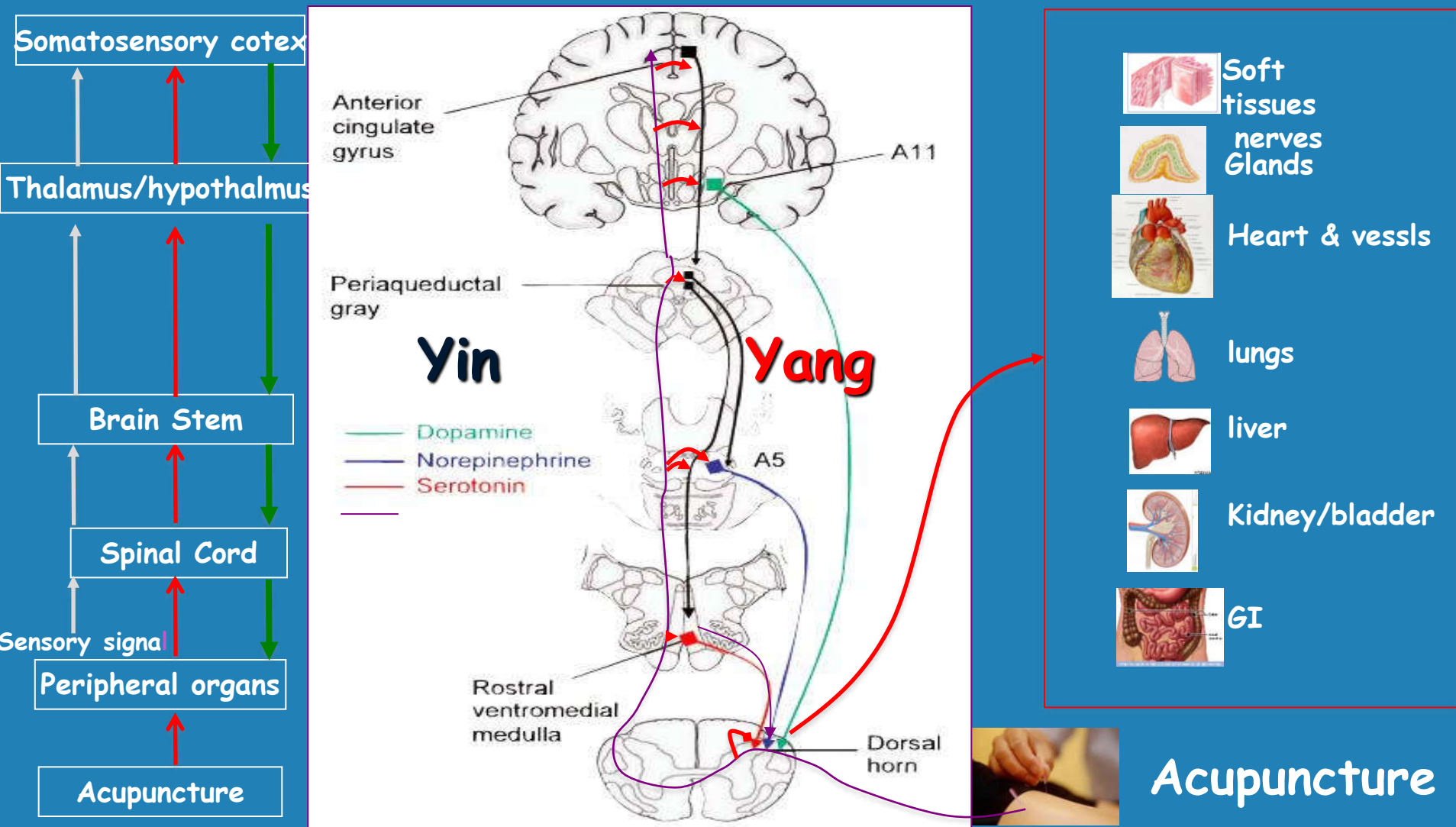


CTS: Baseline



CTS: Post-Acupuncture

# Summary on how acupuncture works



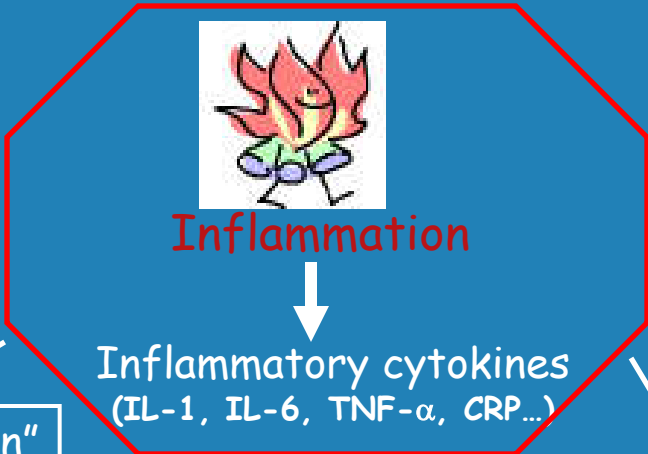
Adapted from Benarroch 2008



# Stresses

Acupuncture

Infection/Irritation/Injuries...



Increase cholesterol

• Heart Disease  
• High BP  
• Stroke

Loss of bone minerals

Insulin resistance

Diabetes

"Switch on" oncogenes

Cancer

"Mess up" CNS

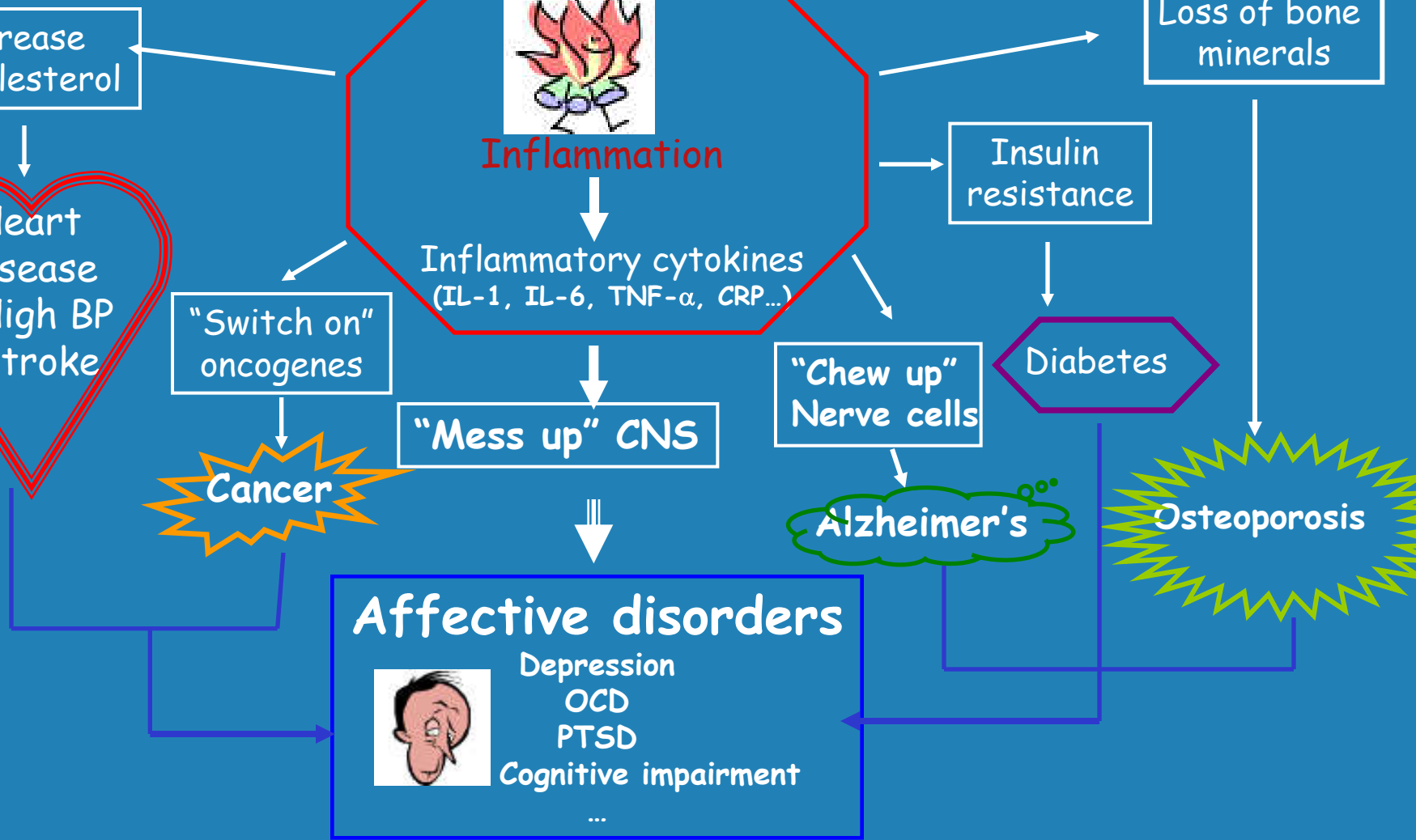
"Chew up" Nerve cells

Alzheimer's

Osteoporosis

**Affective disorders**

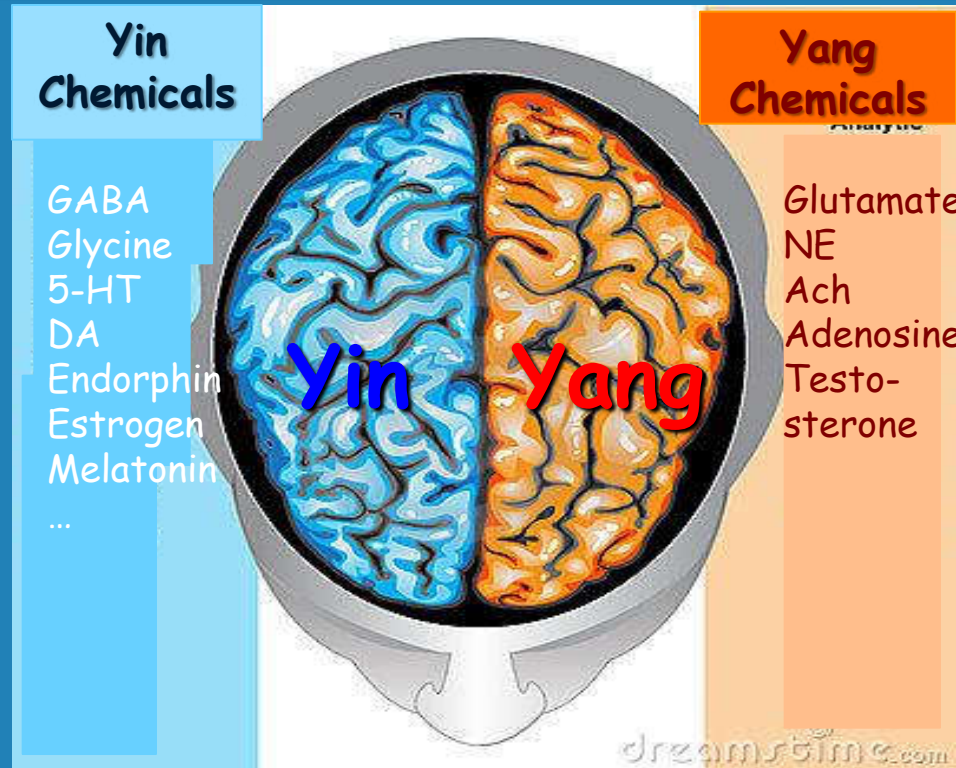
Depression  
OCD  
PTSD  
Cognitive impairment  
...



# Acupuncture:



## Keep Brain Yin-Yang Balanced



Keep free flow of energy  
Keep body healthy  
Keep life quality



