

# Pranayama

Teachers Training

Level 1 2023

Nadis &

The Nervous System



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ॐ ॐ ॐ

श्री गुरुभ्यो नमः हरिः ॐ

Om Om Om

Sri Gurubhyo Namah Harih Om

Salutations to the Gurus!

ॐ सह नाववतु ।  
सह नौ भुनक्तु ।  
सह वीर्यं करवावहै ।  
तेजस्वि नावधीतमस्तु मा विद्विषावहै ।  
ॐ शान्तिः शान्तिः शान्तिः ॥

oṃ saha nāvavatu saha nau bhunaktu  
saha vīryaṃ karavāvahai  
tejasvi nāvadhītam astu mā vidviṣāvahai  
oṃ śāntiḥ śāntiḥ śāntiḥ

May that Brahman protect us together. May it nourish us together. May we both gain great vitality. May our learning be brilliant. May we never argue. Om peace, peace, peace.

# Pranayama - Levels of Organization

## 1. Causal - Karana Sharira

Source - point of origin and return

## 2. **Subtle - Sukshma Sharira**

Pranas, Nadis, Indriyas, Antahkarana

## 3. Physical - Sthula Sharira

### 1. Biomechanical

Respiratory, Cardiovascular, Myofascial & Lymphatic Systems

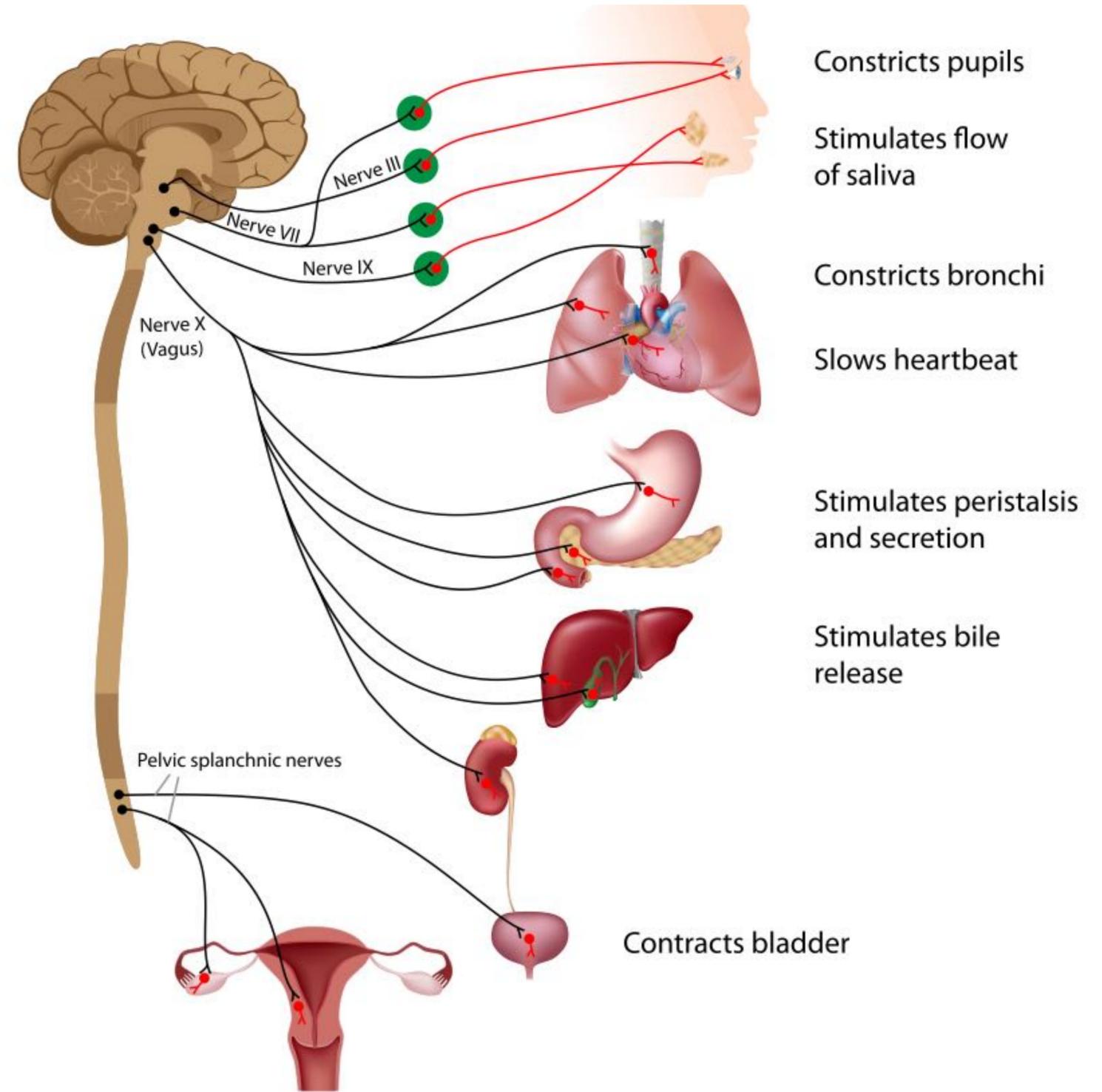
### 2. Biochemistry

Oxygen, Carbon dioxide, Nitric oxide, Blood pH

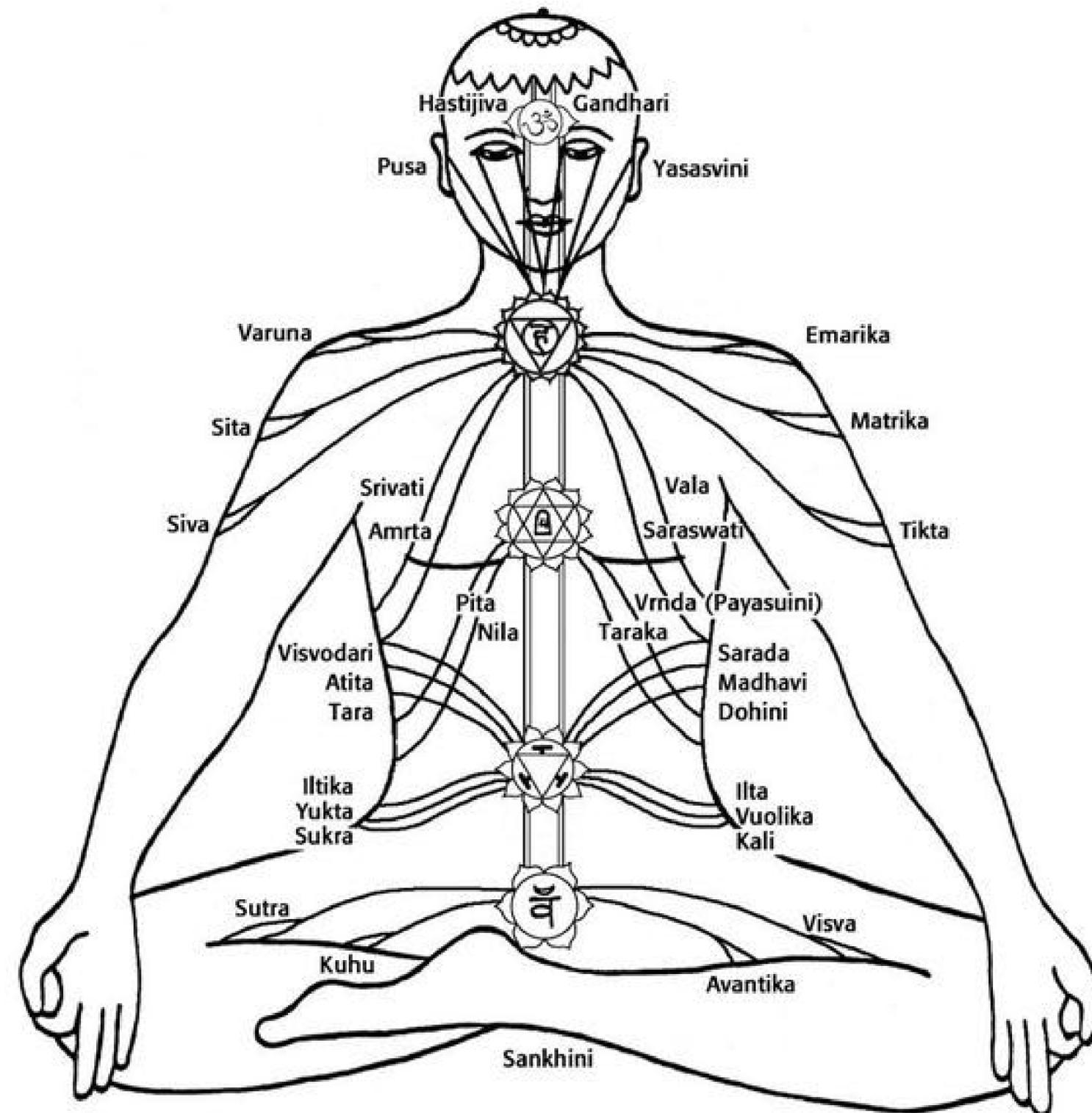
### 3. **Psychophysiology**

Nervous and Endocrine Systems

# Nadis and the Nervous System



# Yogic subtle physiology – the Sukshma Sharira

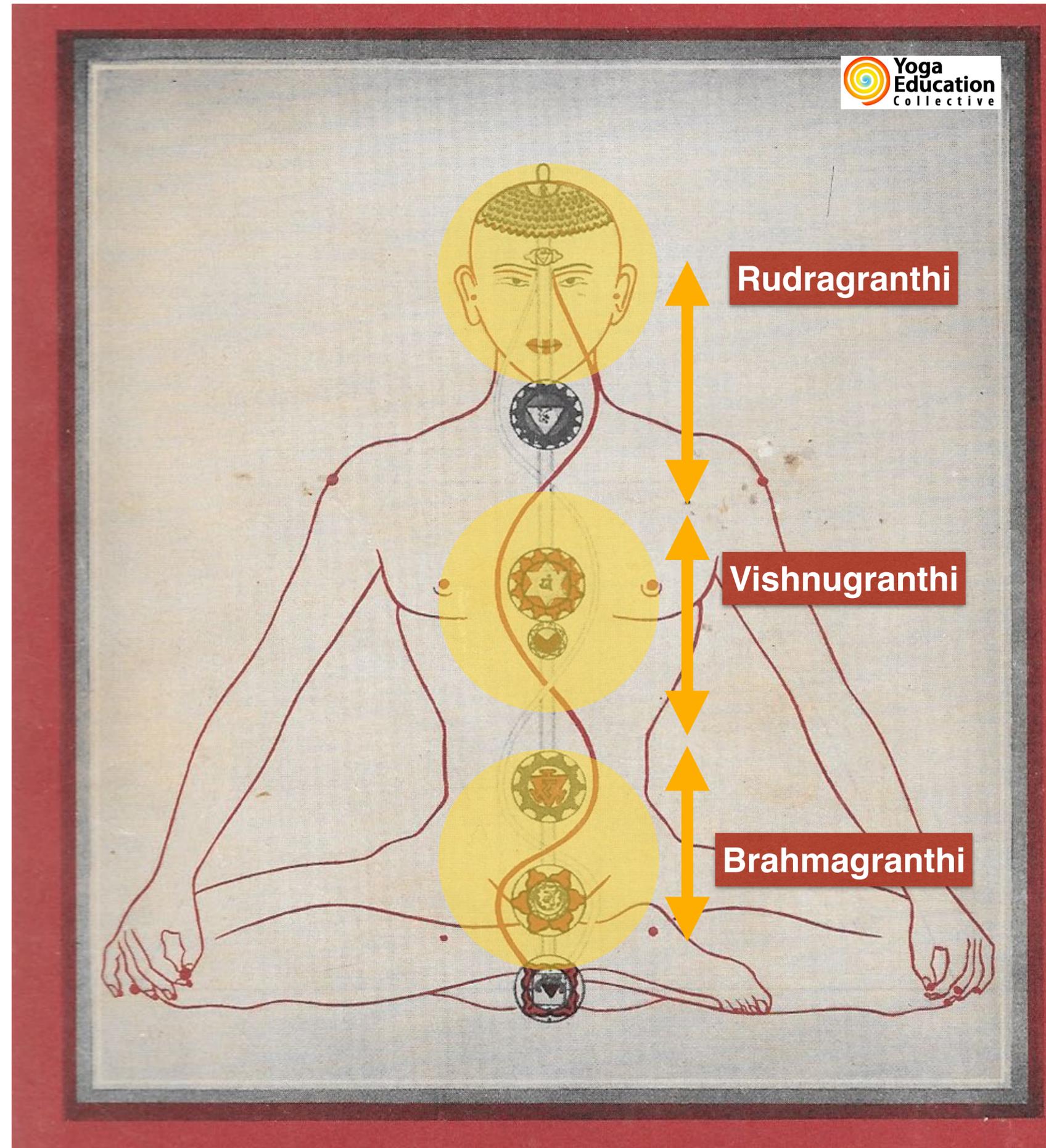


# Granthis

1. Subtle knots or blockages in the sushumna nadi
2. Difficult to untie
3. There are also many 'small' granthis within the Sukshma Sharira

*When the sleeping Kundalini is awakened by the grace of the guru, then all the lotuses [the Chakras or mystic centers] and knots [Granthis] are pierced.*

Hathayogapradipika III-2

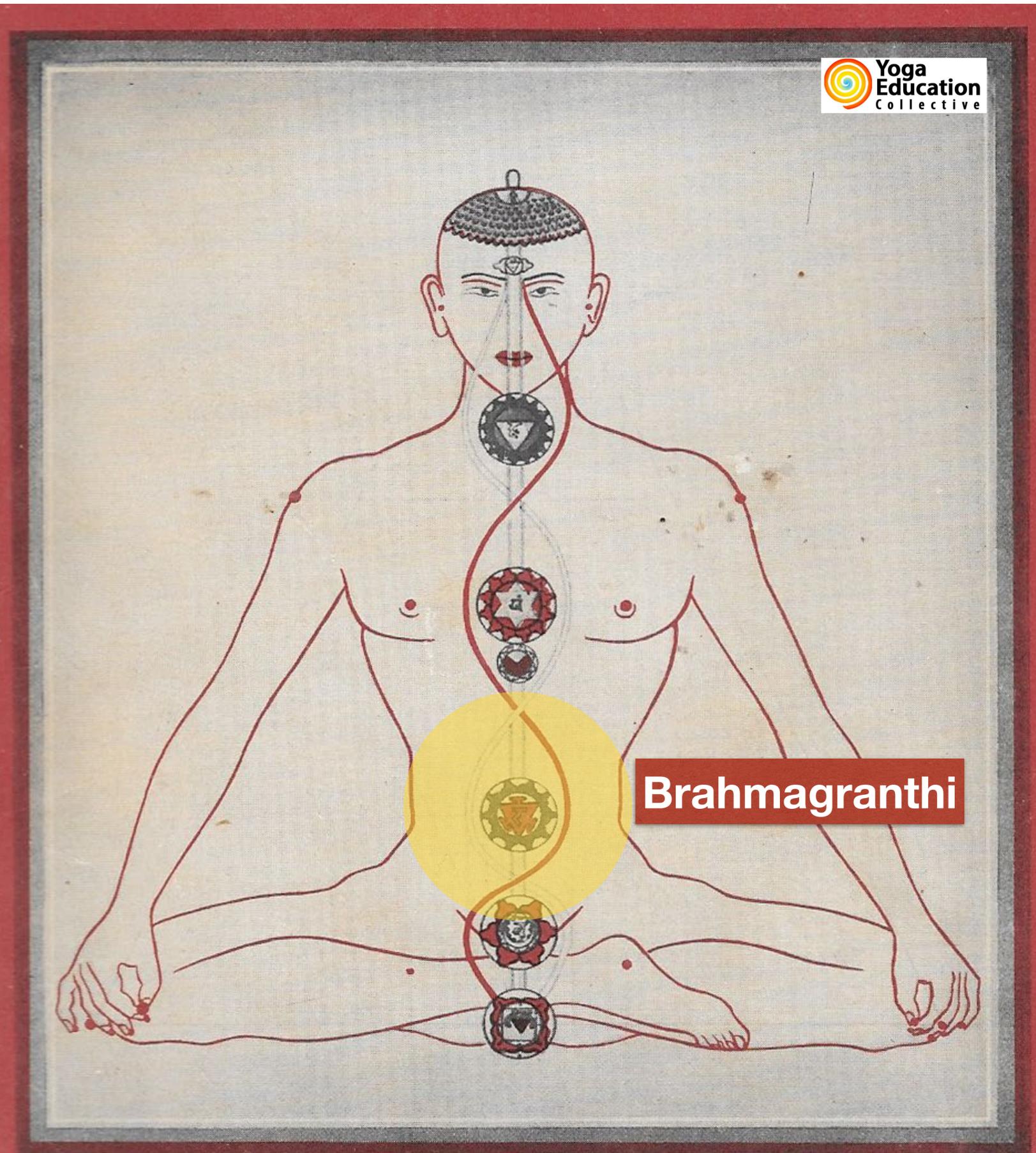


# Brahmagranthi

1. Survival, separateness, insecurity, fear, duality
2. Consciousness at level of desires

*Then the Arambhavastha [is described]: When the knot of **Brahma** [**Brahma Granthi**] is pierced [by Pranayama], there is the bliss arising from the void [Sunya or Akasha] of the heart. Various tinkling sounds [as of ornaments] and the unstruck sound [Anahata Dhvani] are heard [in the middle of] the body.*

Hathayogapradipika IV 69-70

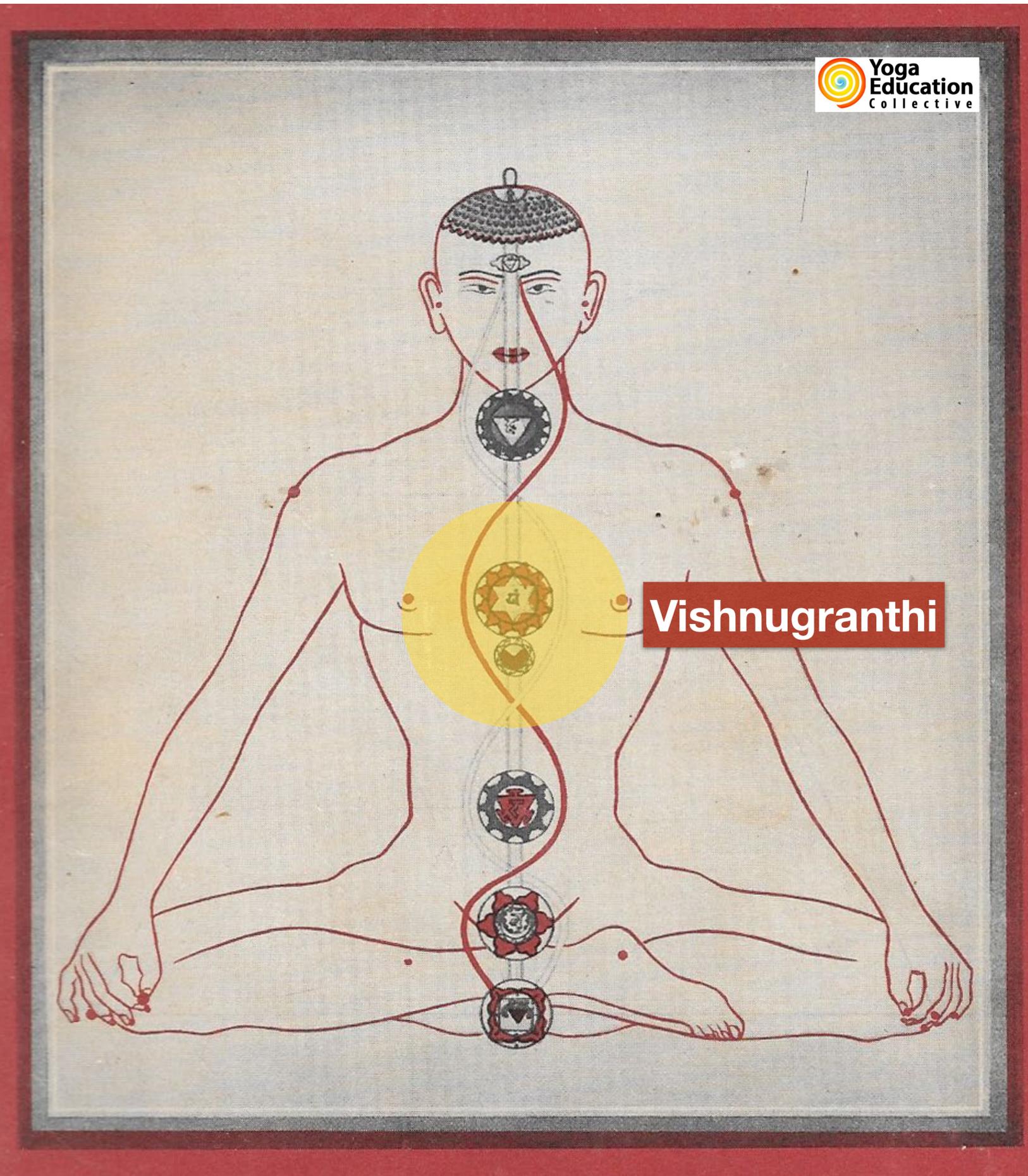


# Vishnugranthi

1. Emotions and ideas
2. Sees unity in diversity but restless with the attachment or desire to do good
3. Sustainance of the physical and subtle bodies is maintained

*In the second (state) concentrated Vayu courses through the middle path (Sushumna). The Yogi's Asana then becomes unshakable, his knowledge increases and he becomes god-like; and then, on account of (his) **Vishnugranthi** being pierced he hears various sounds of a kettle drum being beaten in Atisunya (the nasopharyngeal cavity) which herald supreme bliss.*

Hathayogapradipika IV 71-72

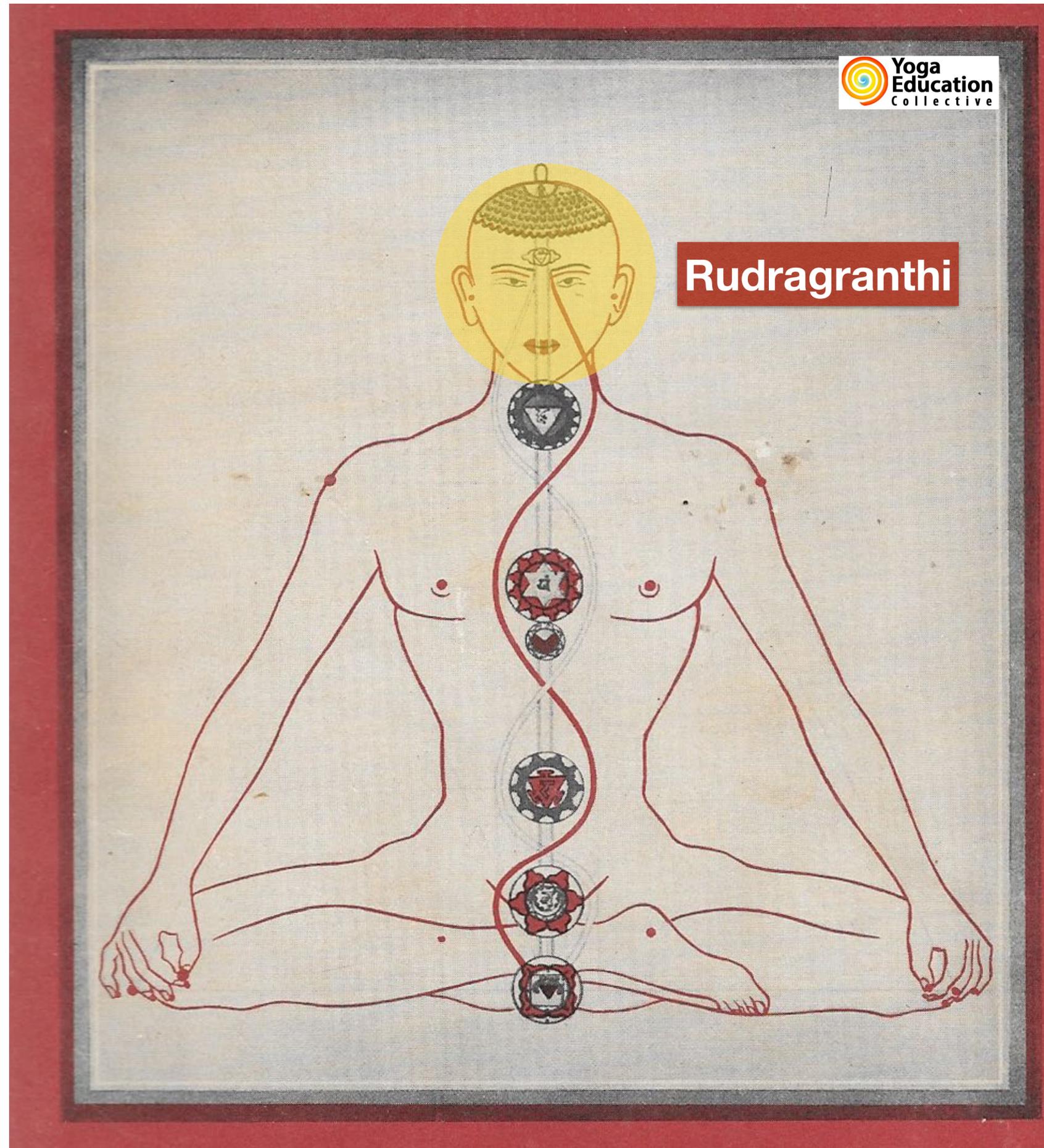


# Rudragranthi

1. Sense of “I-ness”
2. Attachment to knowledge
3. Keeping one’s awareness as a drop, not as the ocean
4. Psychic powers arise as obstacles
5. Duality must be transcended to unity

*Then the Nispattyavastha [is described]:  
Having broken the knot of Rudra [Rudra  
Granthi, in the Ajna Chakra] the Prana  
reaches the seat of Ishvara [which is in the  
akasha between the eyebrows]. Then in  
Nispatti there is heard a sound as of the  
flute which assumes the resonance of Vina.*

Hathayogapradipika IV-75



# Nadis

## प्राणायाम

### Yoga Sadhana unties the Granthis in the Nadis

1. We do not see nadis and granthis but we experience them
2. We can't see our misperceptions until we untie them
3. As we practice, we slowly untie these knots on all levels

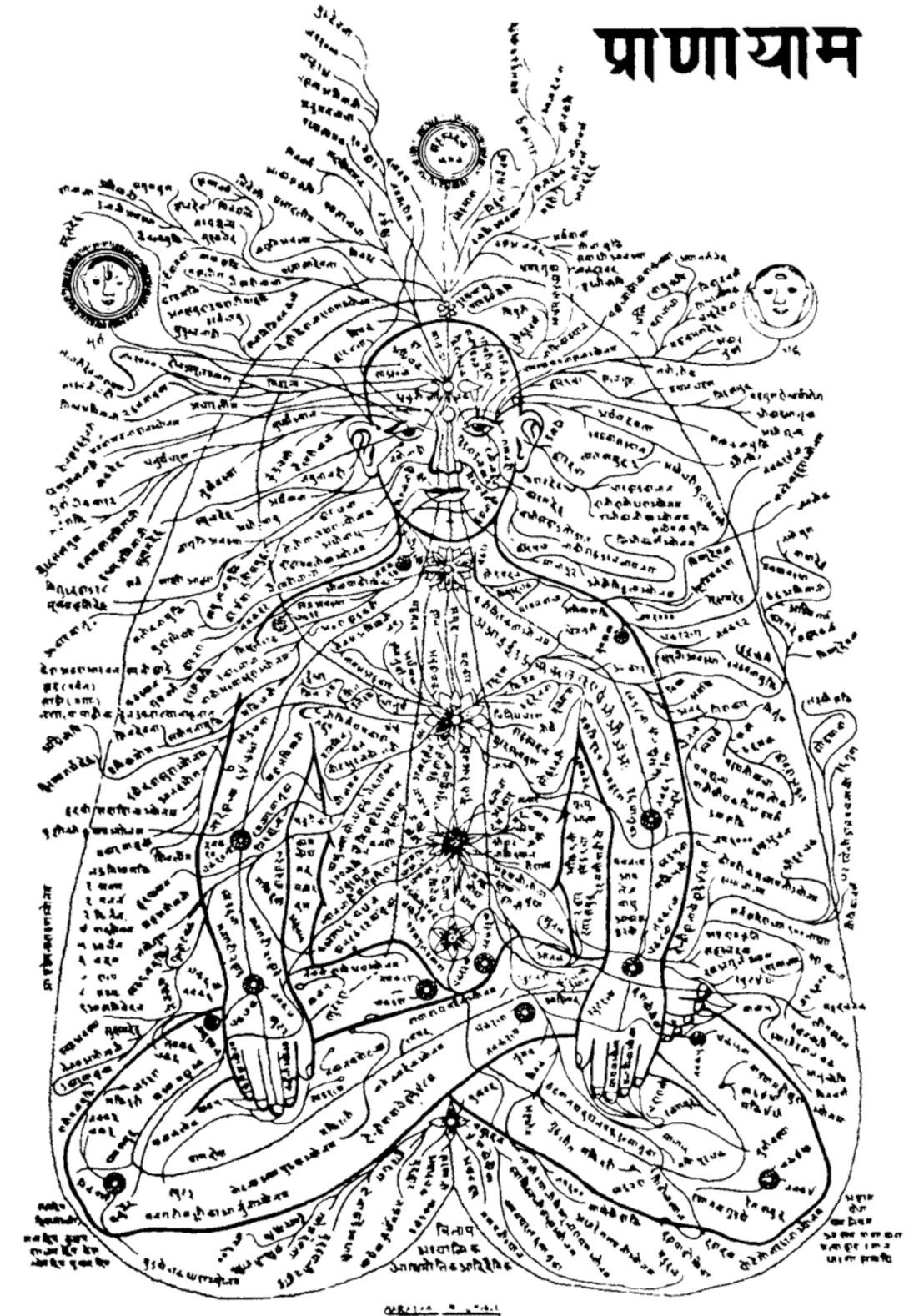
“The jivatama lives in the heart.

Here, there are one hundred and one channels. Each of these channels has one hundred smaller channels. Each of these has 72,000 branching channels. Within these moves the diffused breath (vyana).”

*Prasna Upanishad*

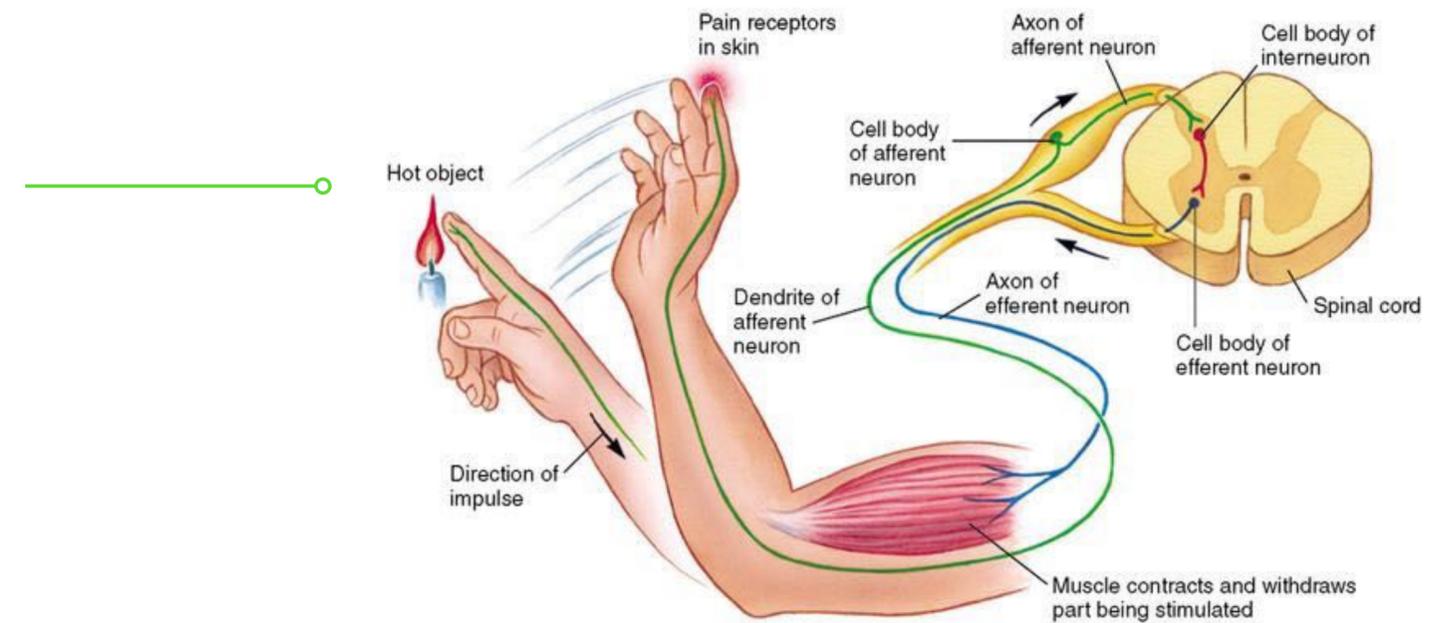
“There are one hundred and one arteries of the heart; one of these passes up to the crown of the head. Going up by it, one goes to immortality.”

*Katha Upanishad 6.16*

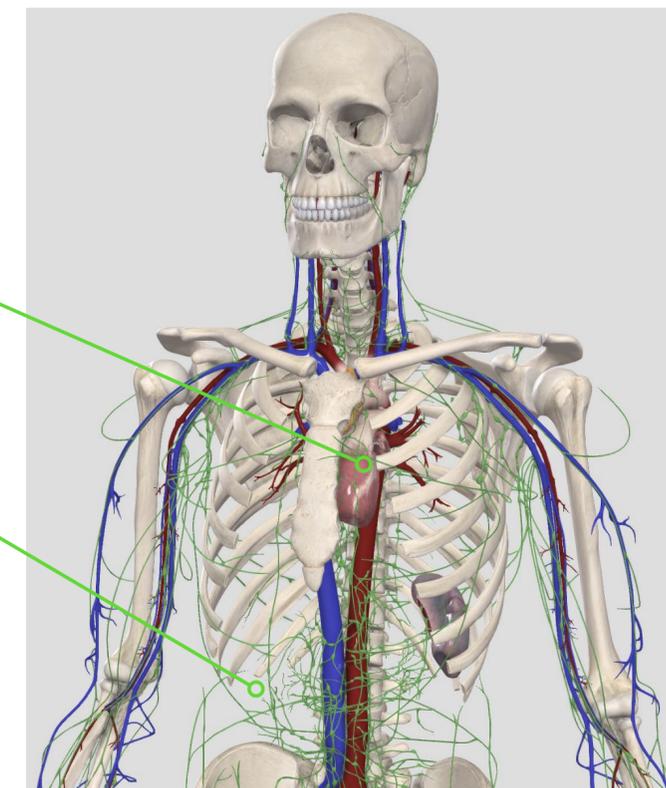


# Nadis, Shiras, Dhamini

In some Yogic texts, the nadis of the Nervous System (neurons) are called **shiras**



In some Yogic texts, the nadis of the Cardio-Vascular and Lymphatic systems are called **dhamini**



Yoga asanas help untie the **granthis** in the **shiras & dhamini** of the sthula sharira

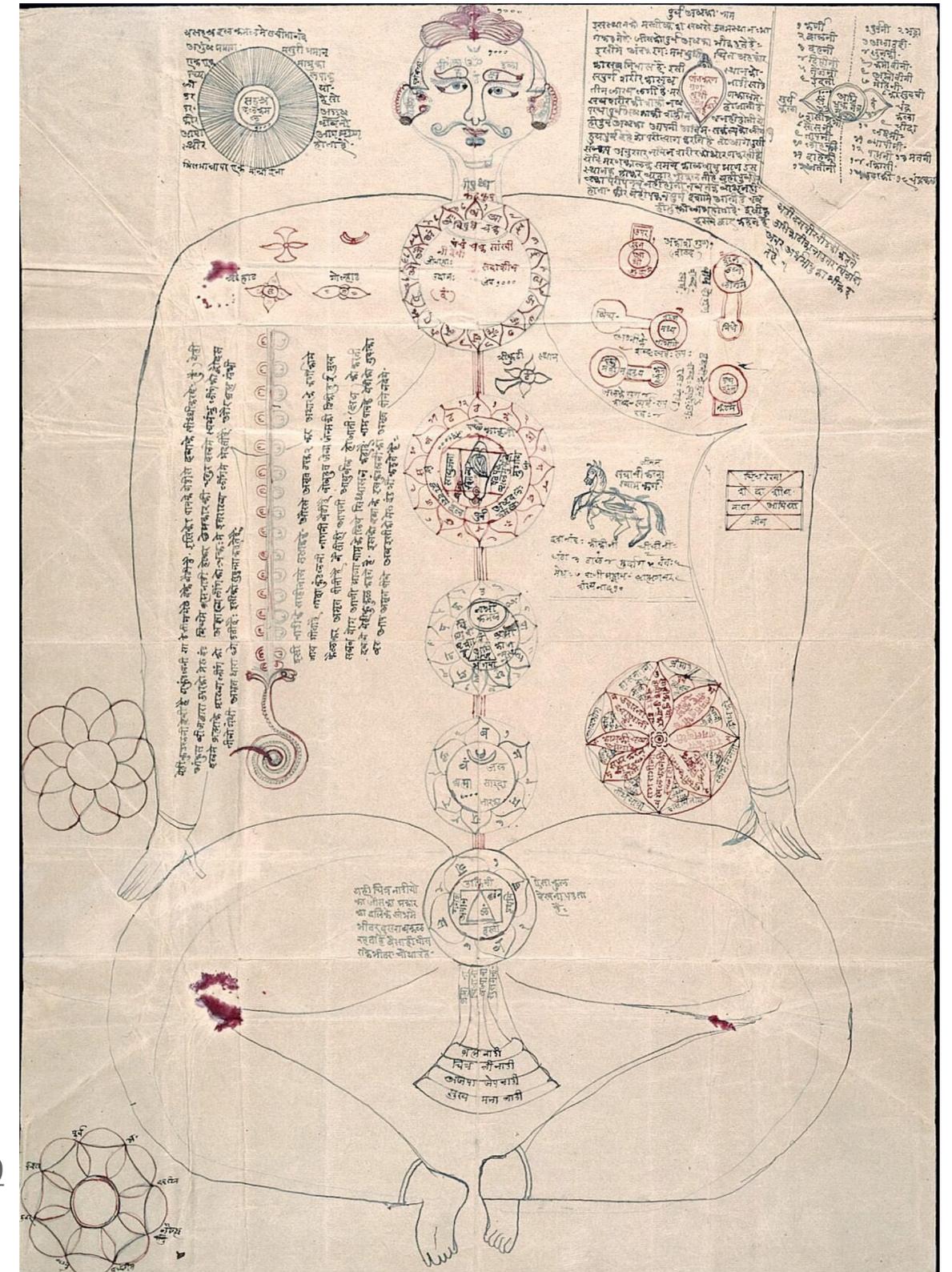
# Nadis

Pranayama helps untie the **granthis** in the **nadis** in the sukshma sharira

The Varaha Upanishad (13-16 cc. CE) further describes it as follows:

*"The nāḍis penetrate the body from the soles of the feet to the crown of the head. In them is prāṇa, the breath of life and in that life abides Ātman, which is the abode of Shakti, creatrix of the animate and inanimate worlds."* (VU 54/5)

[https://en.wikipedia.org/wiki/Nadi\\_%28yoga%29](https://en.wikipedia.org/wiki/Nadi_%28yoga%29)

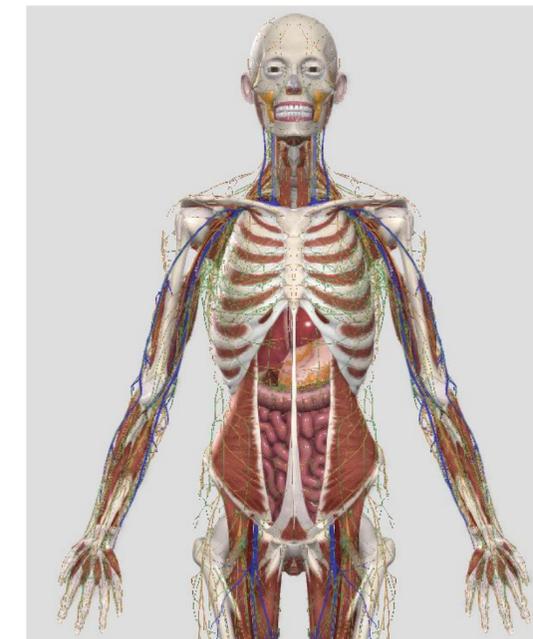
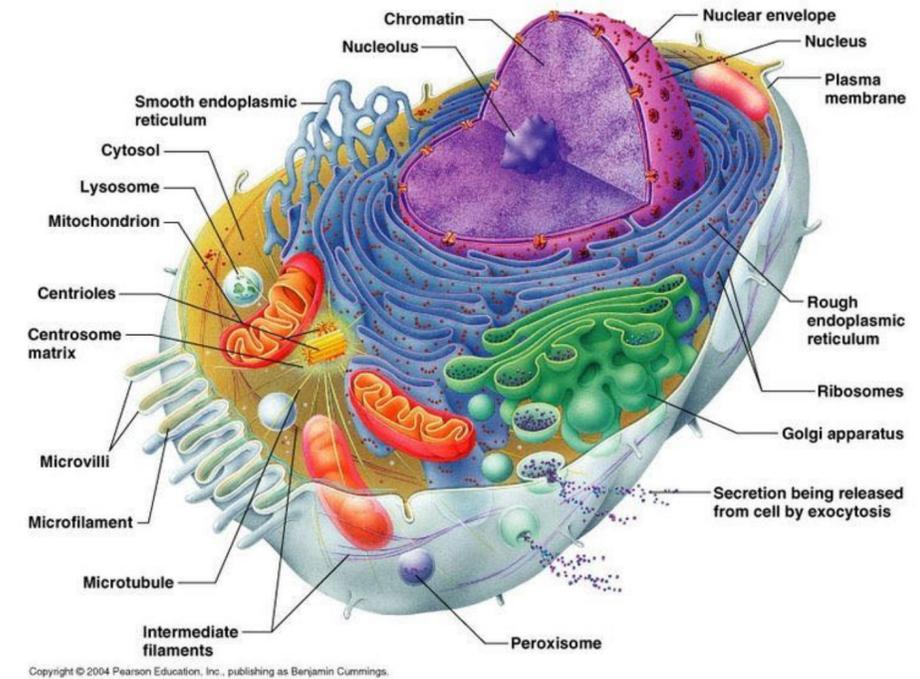


# Homeostasis from the point of view of the Sthula Sharira

**HOMEOSTASIS** is the relative constancy of the body's internal environment. It is the tendency toward a relatively stable equilibrium between interdependent elements, especially as maintained by physiological processes. Our cells use a tremendous amount of energy to maintain homeostasis and it only works when it is supported by our activities.

**CELLS** live in a salty water internal environment, and survive if conditions remain stable. Temperature, salt, content, acid level (pH), fluid volume, oxygen and other conditions must remain within acceptable limits.

**THE BODY** evolved over millions of years to carry this salty water environment within it, whereas as a unicellular organism, it was surrounded by the salty water environment.

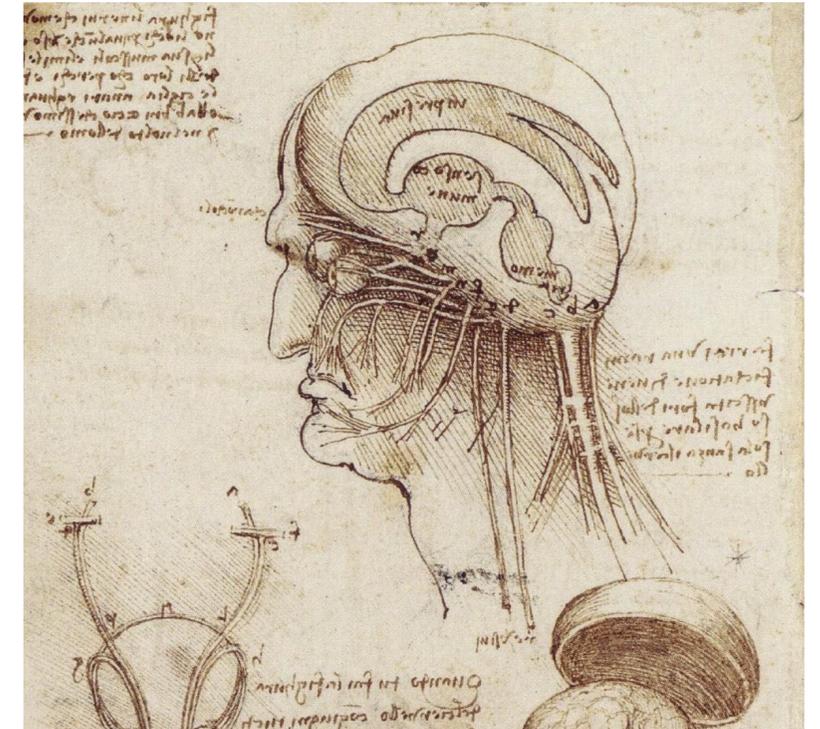


# Yoga practice primarily works on our physiological systems

**Via the Nervous System:** Sends information very quickly and responses are generally short lived.

*“The function of the nervous system is to perceive the environment and coordinate the behavior of all the other cells of our vast cellular community.”*

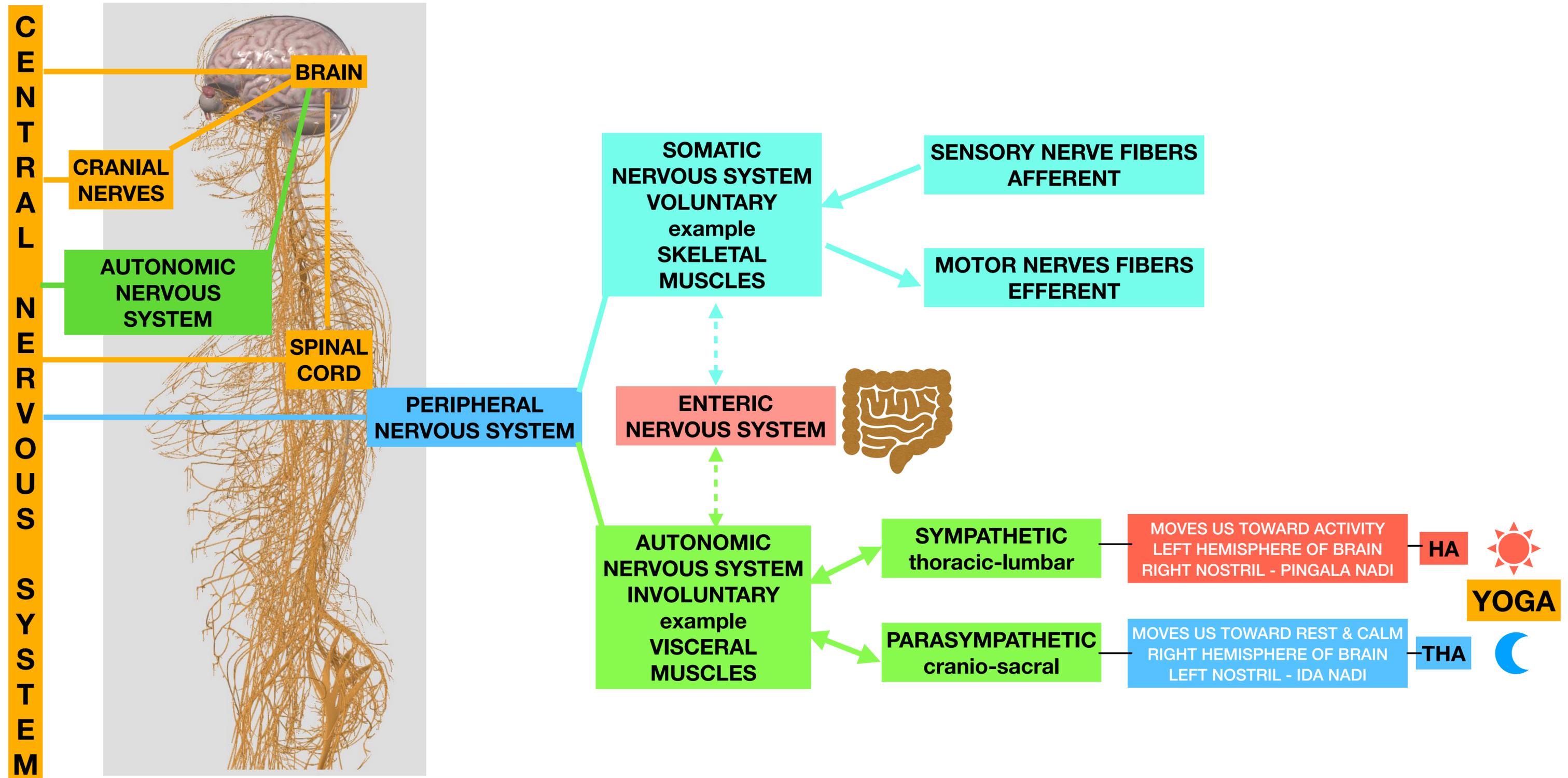
Dr. Bruce Lipton, *The Biology of Belief*



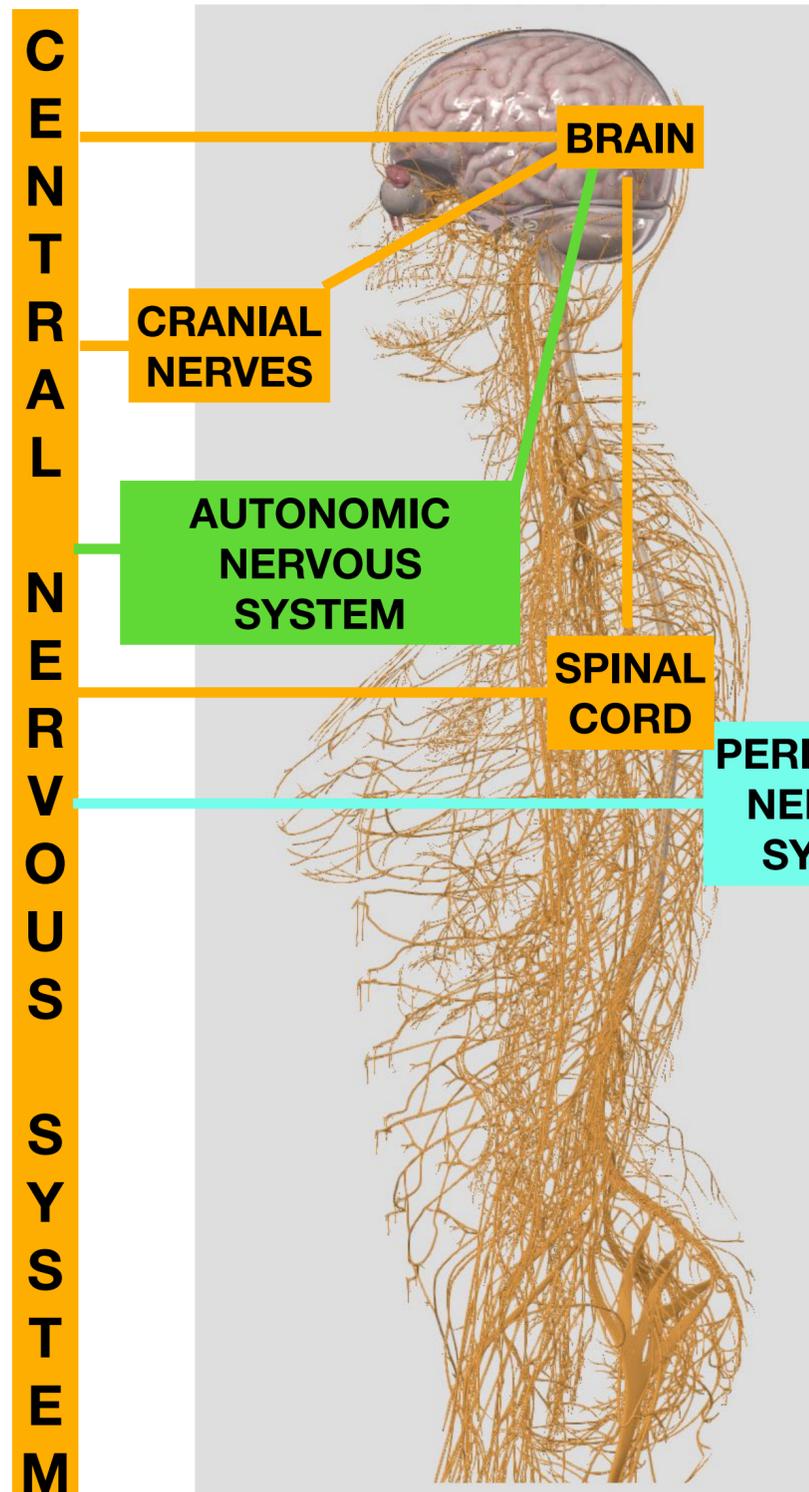
**And the Endocrine System:** The collection of glands of an organism that secrete hormones directly into the circulatory system to be carried towards distant target organs. The effects are slow to initiate and prolonged in their response, lasting from a few hours up to weeks.



# The Nervous System – Overview



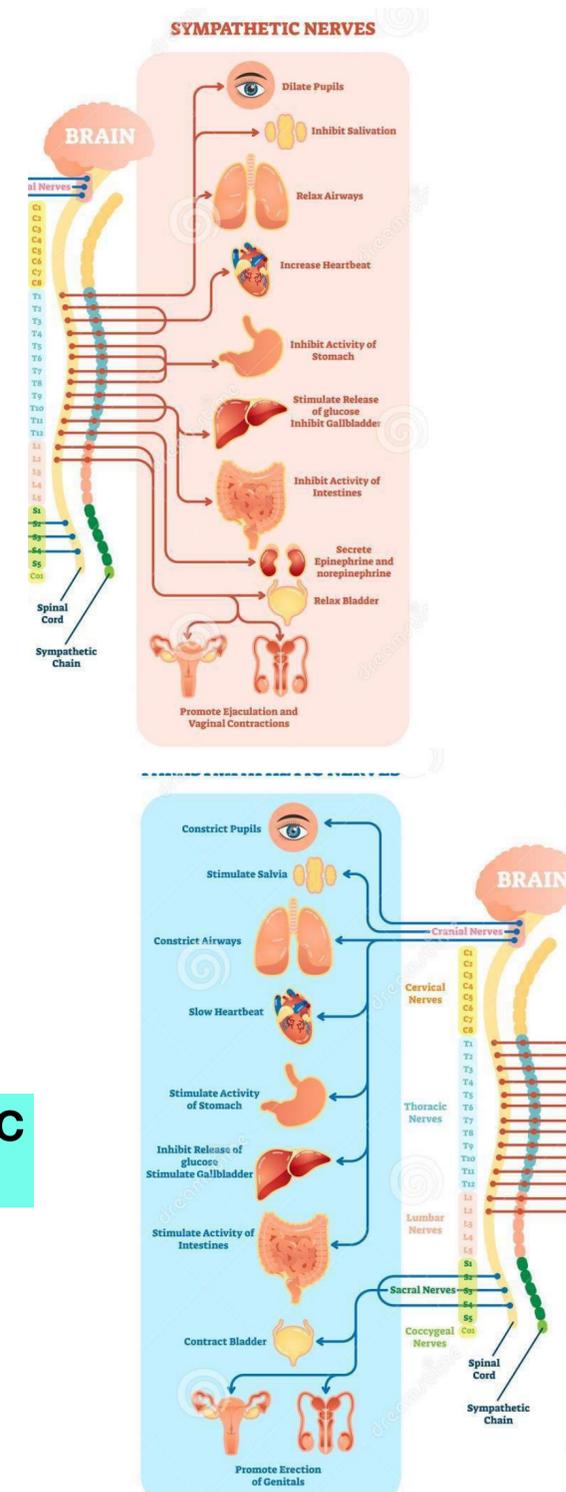
# The Nervous System – Overview



**AUTONOMIC NERVOUS SYSTEM INVOLUNTARY**

**SYMPATHETIC thoracic-lumbar**

**PARASYMPATHETIC cranio-sacral**



**HA**

**MOVES US TOWARD ACTIVITY  
LEFT HEMISPHERE OF BRAIN  
RIGHT NOSTRIL  
PINGALA NADI**

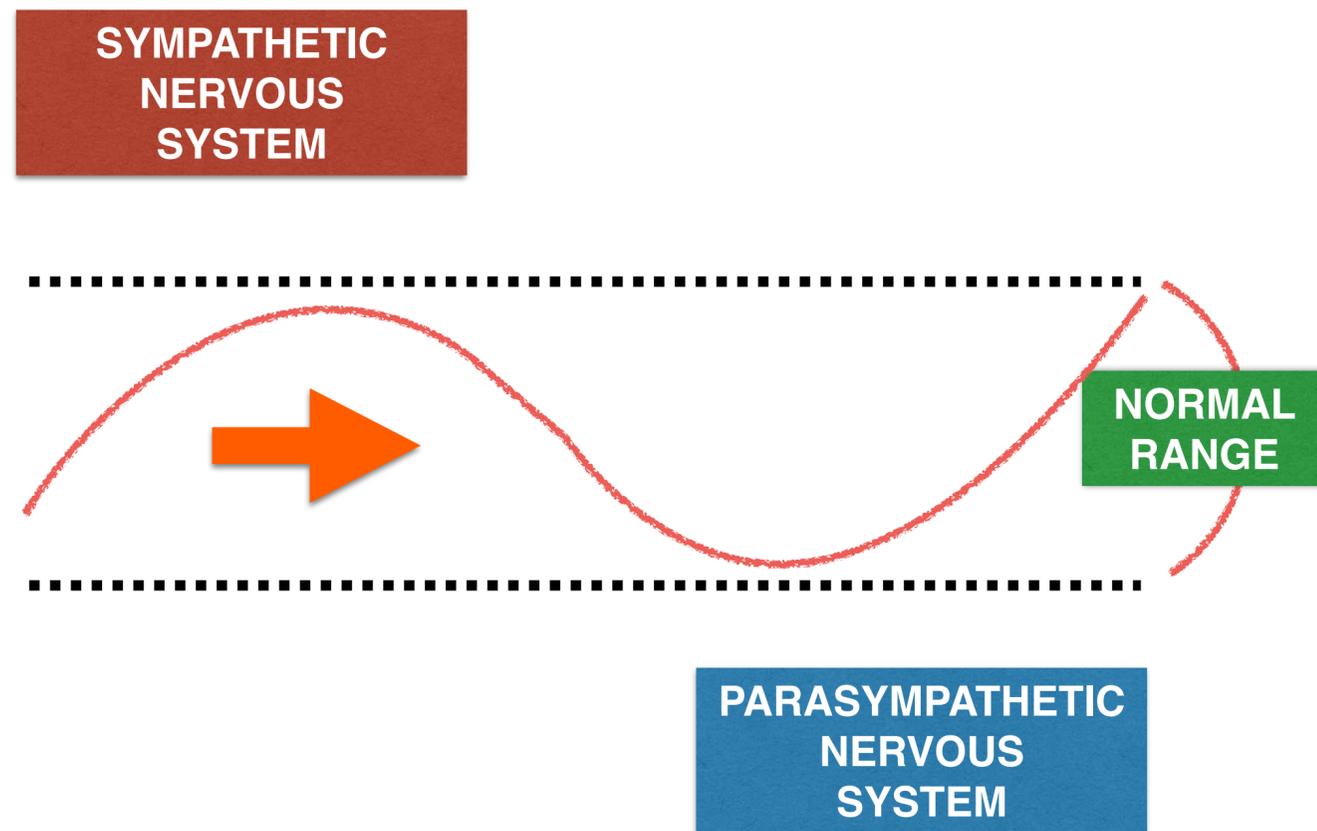
**YOGA**

**MOVES US TOWARD REST & CALM  
RIGHT HEMISPHERE OF BRAIN  
LEFT NOSTRIL  
IDA NADI**

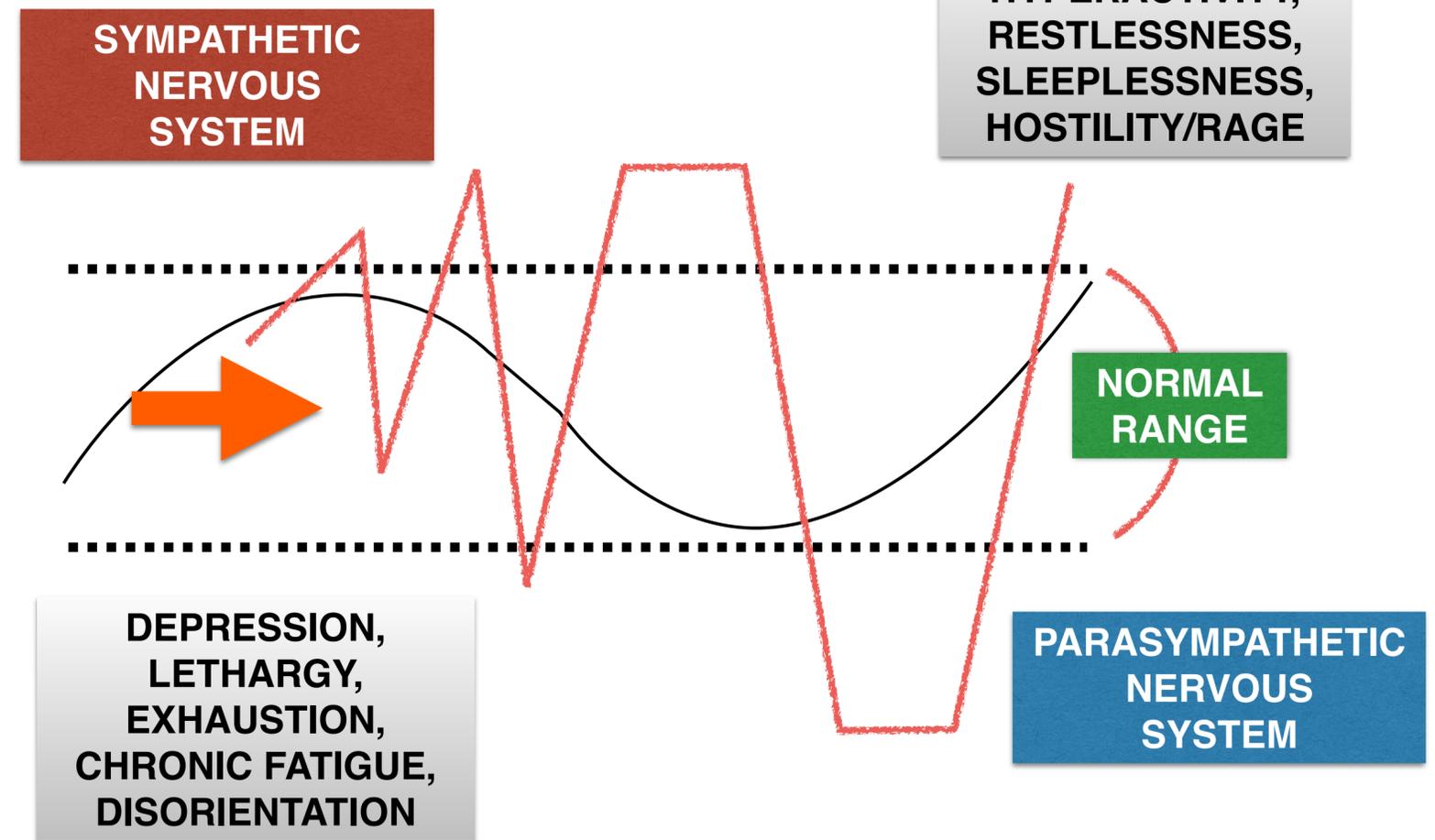
**THA**



# Nervous system balance and imbalance

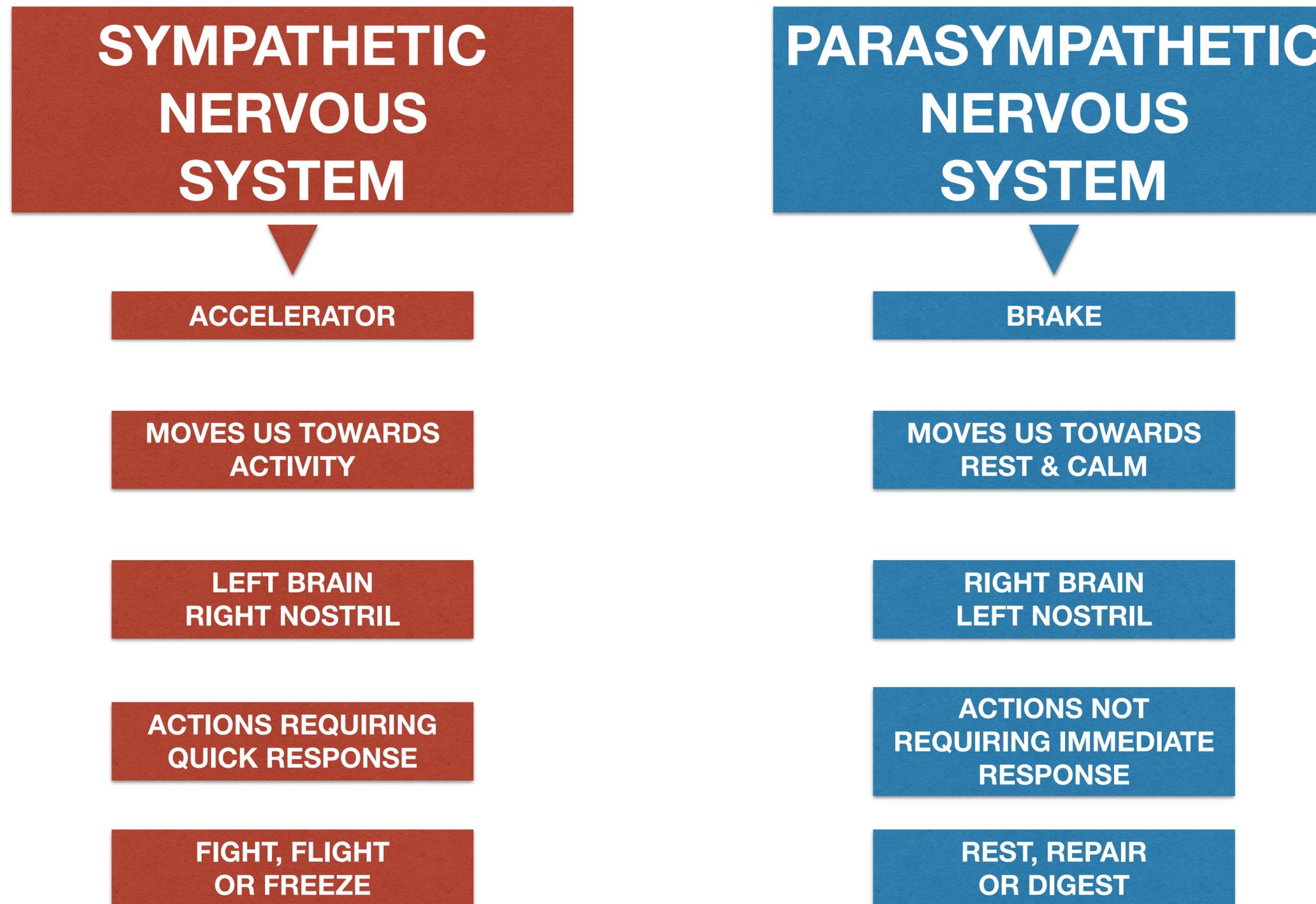


**HEALTHY NERVOUS SYSTEM**



**STRESSED NERVOUS SYSTEM**

# Sympathetic and Parasympathetic activity



# Sympathetic and Parasympathetic activity

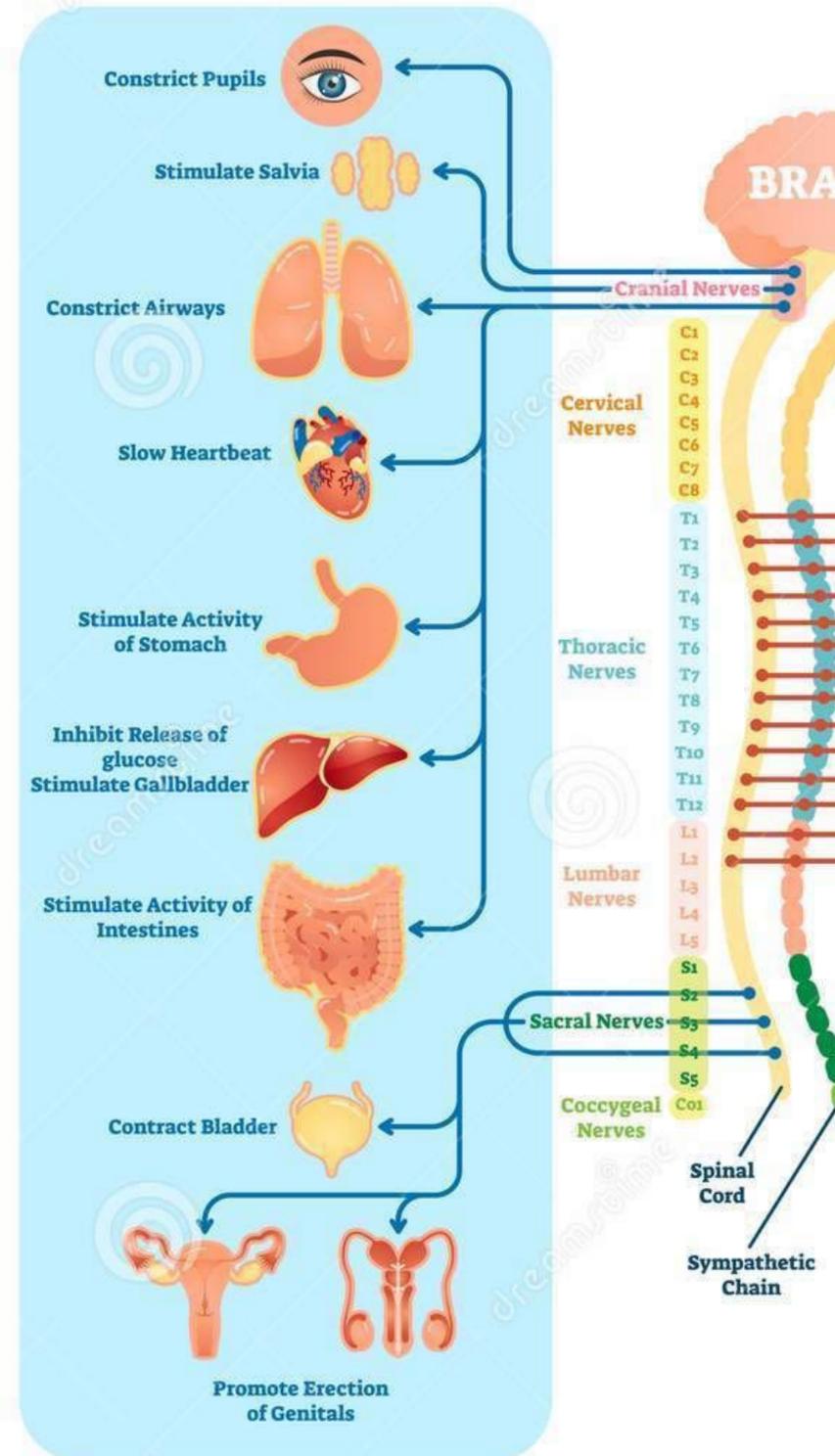
## PARASYMPATHETIC NERVOUS SYSTEM

MOVES US TOWARDS REST & CALM

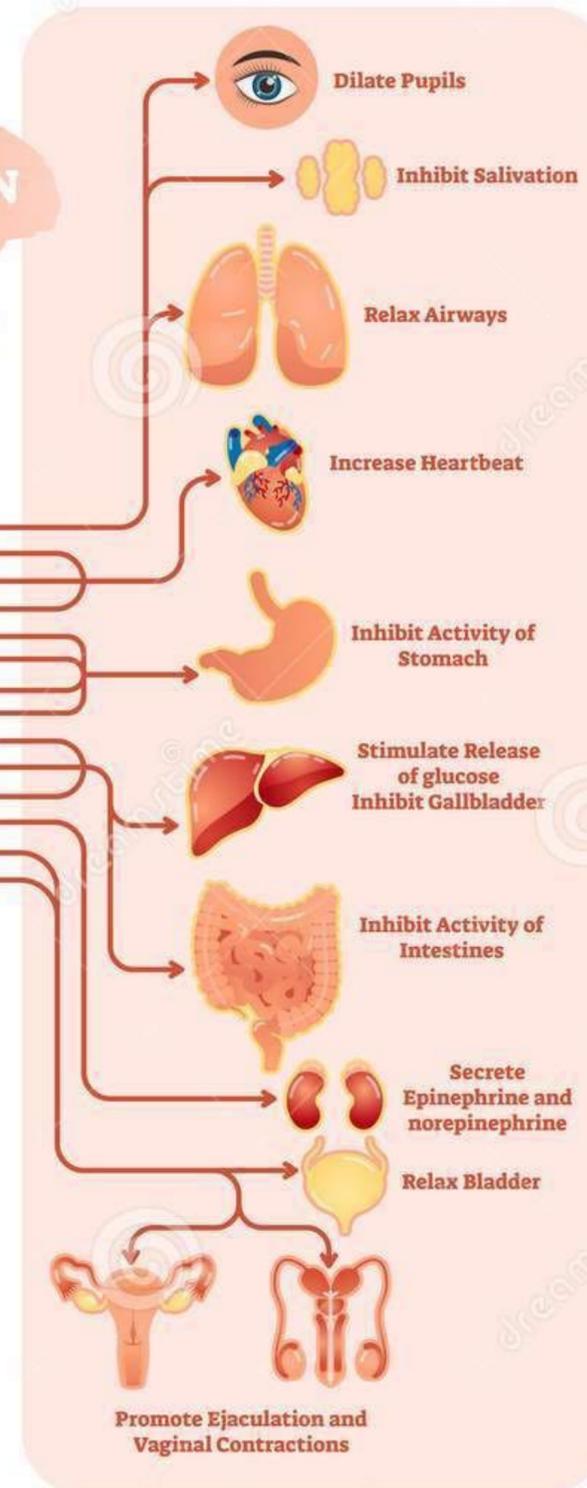
- Slows down heartbeat
- Promotes digestive gland secretion
- Stimulates smooth muscles in digestive tract
- Contracts urinary bladder
- Relaxes urinary sphincter
- Increases secretion of tears and saliva

RIGHT BRAIN  
LEFT NOSTRIL

## PARASYMPATHETIC NERVES



## SYMPATHETIC NERVES



## SYMPATHETIC NERVOUS SYSTEM

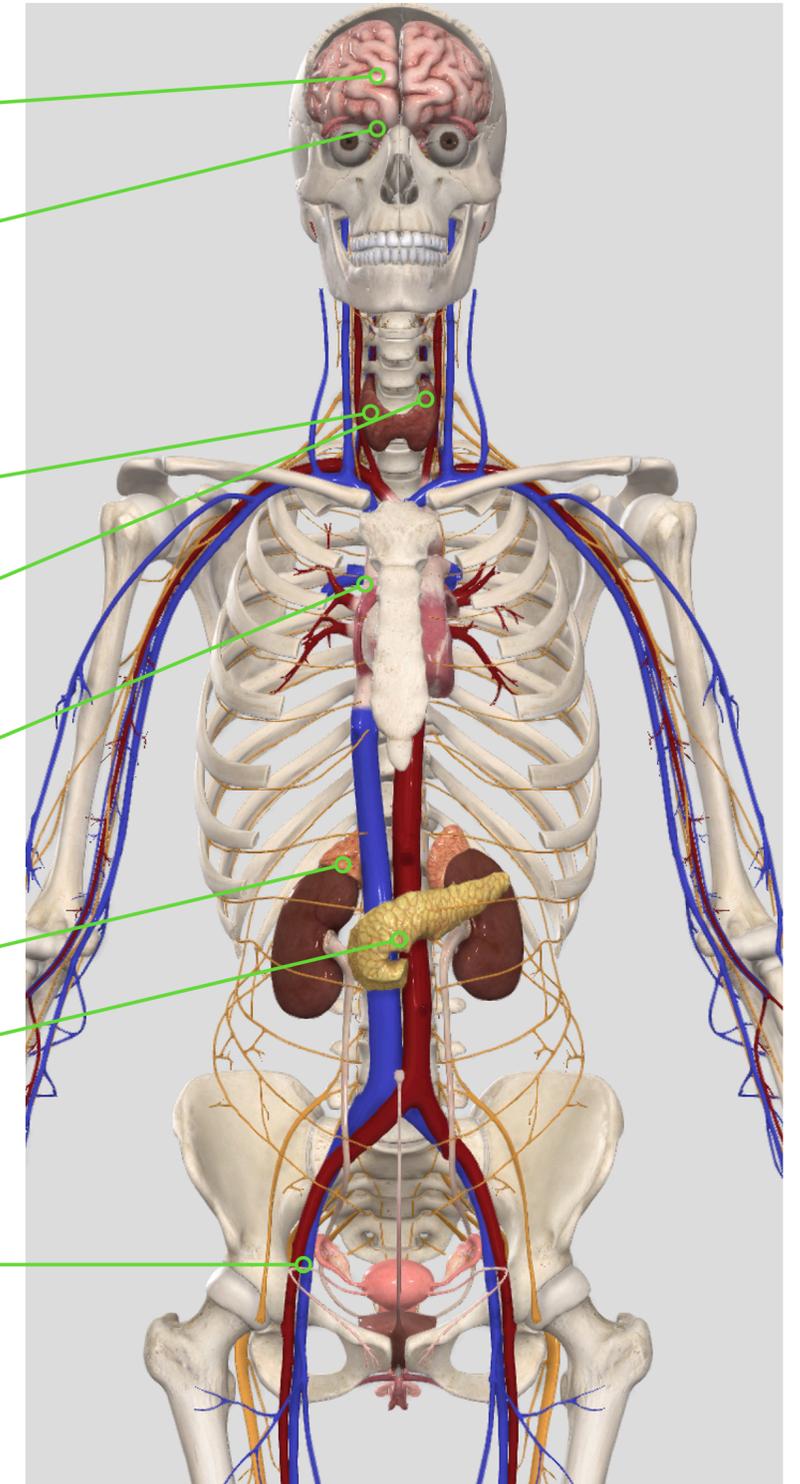
MOVES US TOWARDS ACTIVITY

- Increased heart rate
- Increased cardiac muscle contraction
- Dilation of coronary vessels
- Dilation of skeletal blood vessels
- Constriction of digestive organ blood vessels
- Dilation of respiratory airways
- Increased rate and depth of breath
- Increased sweating
- Increased conversion of glycogen into glucose by liver

LEFT BRAIN  
RIGHT NOSTRIL

# The Endocrine System

1. **Pineal gland** produces melatonin, a serotonin-derived hormone which modulates sleep patterns in both circadian and seasonal cycles
2. **Pituitary gland** helps control growth, blood pressure, functions of the sex organs, thyroid glands and metabolism as well as aspects of pregnancy, childbirth, nursing, water/salt concentration at the kidneys, temperature regulation and pain relief
3. **Thyroid gland** primarily influences the metabolic rate and protein synthesis
4. **Parathyroid glands** help regulate the amount of calcium in the blood and within the bones
5. **Thymus gland** provides an environment for development of T cells critical for immune system
6. **Adrenal glands** provide a rapid response to stress situations
7. **Pancreas** helps blood sugar control, metabolism and digestion
8. **Ovaries** regulate sexual characteristics, growth and balance in females
9. **Testis** regulate sexual characteristics, growth and balance in males



# References

1. <https://3d4medical.com> The App used in the Lessons.

Illustrations used in the slides are from **Complete Anatomy** by Elsevier unless otherwise noted

2. [https://en.wikipedia.org/wiki/Main\\_Page](https://en.wikipedia.org/wiki/Main_Page)

3. <https://www.ninjanerd.org>

Respiration: <https://www.ninjanerd.org/lecture-category/respiratory>

4. Crash Course in Anatomy & Physiology: YouTube channel: <https://www.youtube.com/watch?v=uBGI2BujkPQ>

1. **INTRODUCTION**

- [https://www.youtube.com/watch?v=qPix\\_X-9t7E&index=8&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8](https://www.youtube.com/watch?v=qPix_X-9t7E&index=8&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8)

2. **ACTION POTENTIAL**

- [https://www.youtube.com/watch?v=OZG8M\\_IdA1M&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8&index=9](https://www.youtube.com/watch?v=OZG8M_IdA1M&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=9)

3. **SYNAPSES**

- [https://www.youtube.com/watch?v=VitFvNvRIIY&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8&index=10](https://www.youtube.com/watch?v=VitFvNvRIIY&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=10)

4. **CENTRAL NERVOUS SYSTEM**

- [https://www.youtube.com/watch?v=q8NtmDrb\\_qo&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8&index=11](https://www.youtube.com/watch?v=q8NtmDrb_qo&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=11)

5. **PERIPHERAL NERVOUS SYSTEM**

- [https://www.youtube.com/watch?v=QY9NTVh-Awo&index=12&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8](https://www.youtube.com/watch?v=QY9NTVh-Awo&index=12&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8)

6. **AUTONOMIC NERVOUS SYSTEM**

- [https://www.youtube.com/watch?v=71pCilo8k4M&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8&index=13](https://www.youtube.com/watch?v=71pCilo8k4M&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=13)

7. **SYMPATHETIC NERVOUS SYSTEM**

- [https://www.youtube.com/watch?v=0IDgBICHVsA&index=14&list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8](https://www.youtube.com/watch?v=0IDgBICHVsA&index=14&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8)

8. **PARASYMPATHETIC NERVOUS SYSTEM**

- [https://youtu.be/qqU-VjqiczE?list=PL8dPuuaLjXtOAKed\\_MxxWBNaPno5h3Zs8](https://youtu.be/qqU-VjqiczE?list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8)

ॐ सर्वे भवन्तु सुखिनः  
सर्वे सन्तु निरामयाः ।  
सर्वे भद्राणि पश्यन्तु  
मा कश्चिद्दुःखभाग्भवेत् ।  
ॐ शान्तिः शान्तिः शान्तिः ॥

oṃ sarve bhavantu sukhinaḥ  
sarve santu nirāmayāḥ  
sarve bhadrāṇi paśyantu  
mā kaścid duḥkha bhāgbhavet  
oṃ śāntiḥ śāntiḥ śāntiḥ

May all be happy, may all be free from disease, may all see goodness,  
may none suffer from sorrow.

ॐ असतो मा सद्गमय ।  
तमसो मा ज्योतिर्गमय ।  
मृत्योर्मा अमृतं गमय ।  
ॐ शान्तिः शान्तिः शान्तिः ॥ हरिः ॐ तत्सत् ॥

asato mā sadgamaya  
tamasomā jyotir gamaya  
mrityormāamritam gamaya  
Om śhānti śhānti śhāntiḥ harih om tat sat

Lead me from changing existence to unchanging being,  
lead me from the darkness of tamas to the light of knowledge,  
lead me from death to immortality. Harih om that is truth.