How to Explain Chiropractic According to the Science ("Brain Model")



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VP Research, Dean Research

New Zealand College of Chiropractic



New Zealand College of Chiropractic

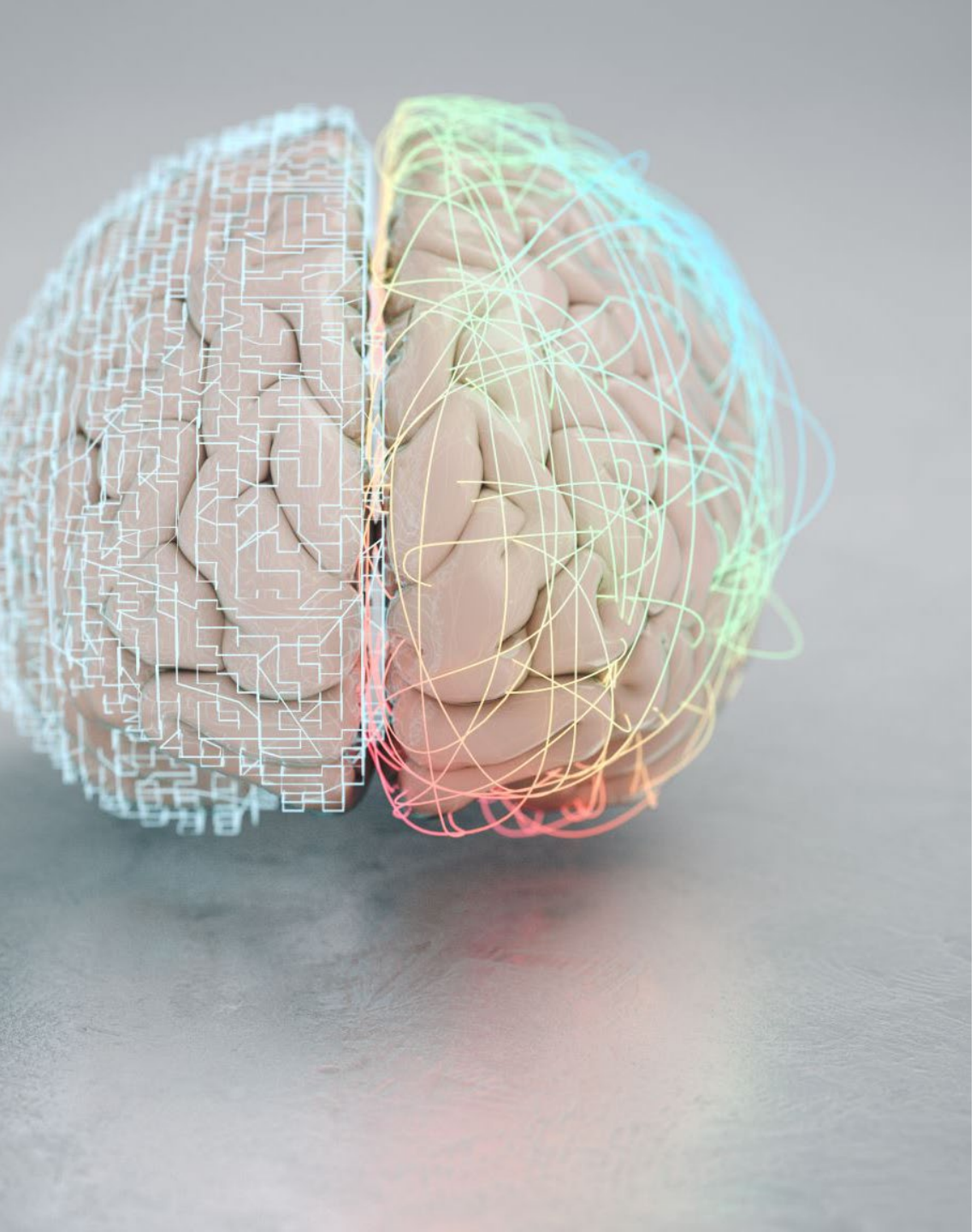
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Questions

- Do you have a spine model in your practice?
- Do you have a brain model in your practice?





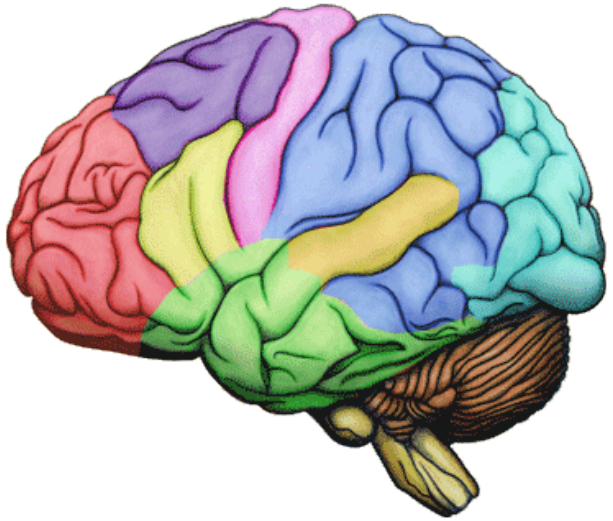
The Short Version

"Research indicates that chiropractic care enhances brain-body communication, allowing your brain to more accurately interpret internal and external signals. This improved perception of what is happening inside you and around you enables your brain to optimize bodily functions and adapt more effectively to your environment."

Heidi Haavik

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Two main chapters to this story





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Vertebral Subluxation

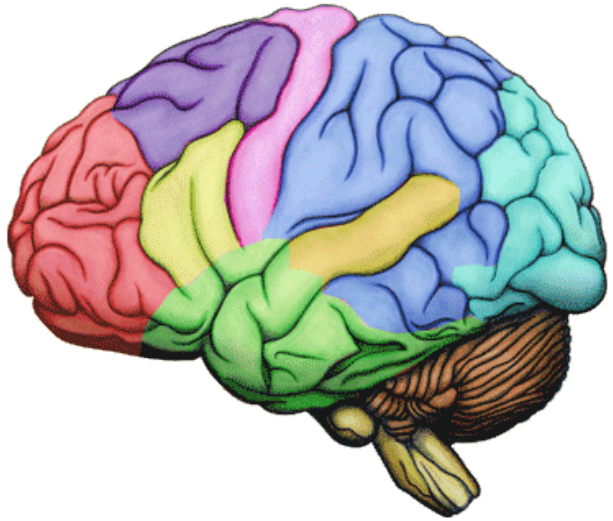
What is spinal dysfunction?
What is normal spinal function?



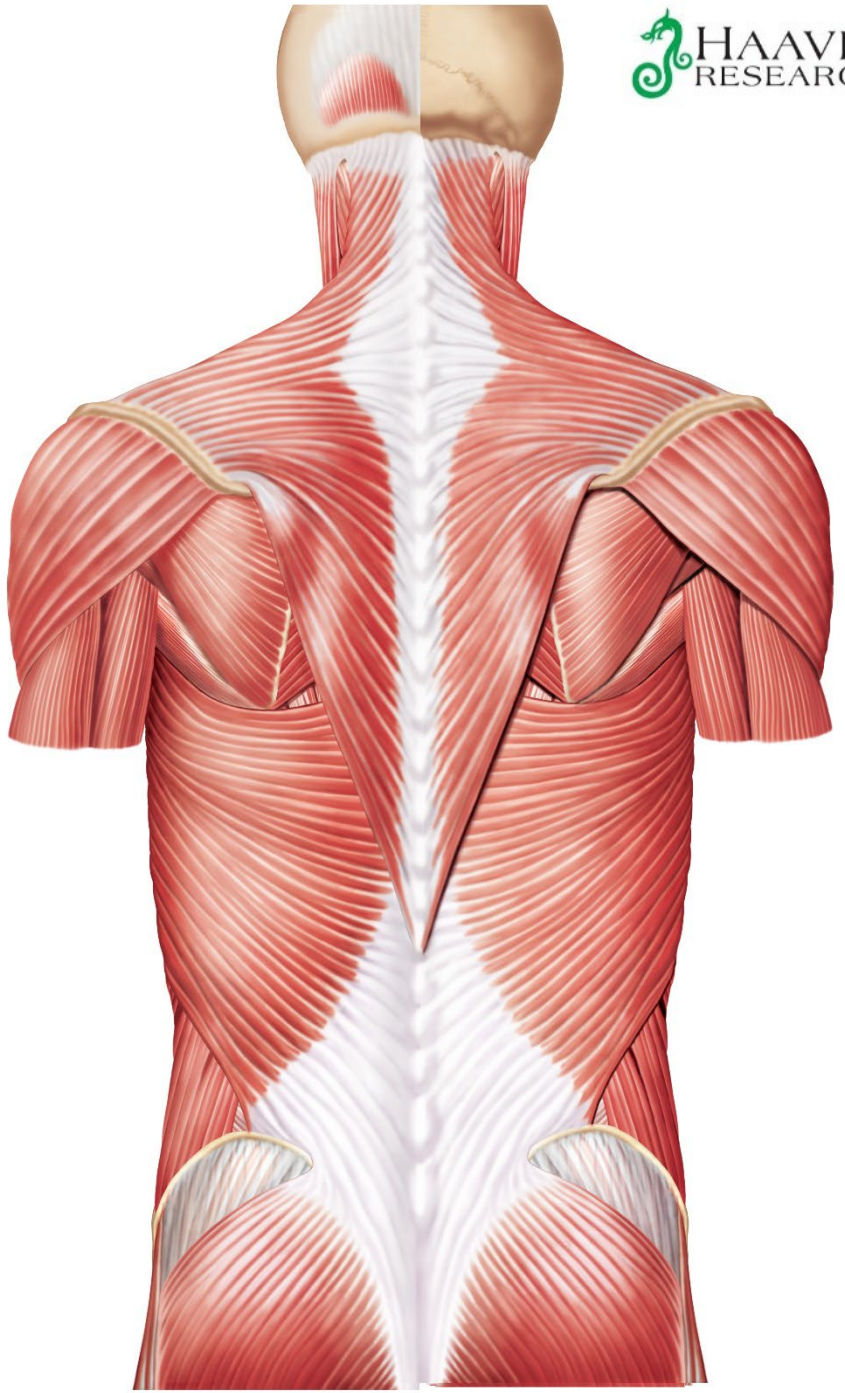
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Bones do not move themselves



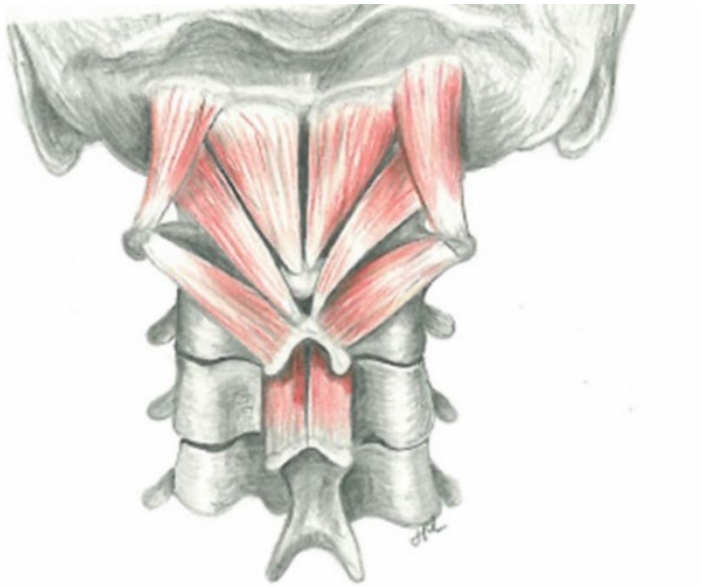


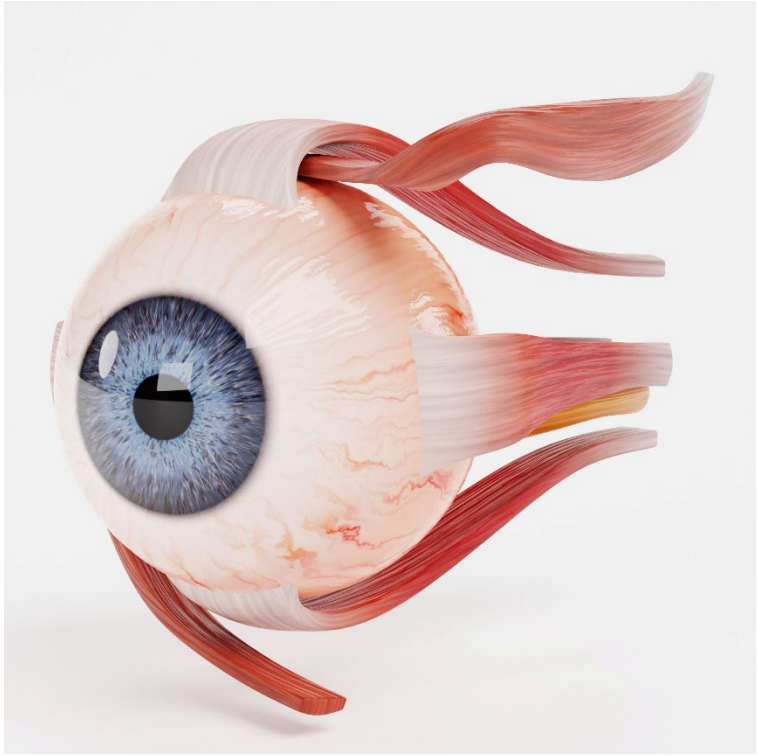


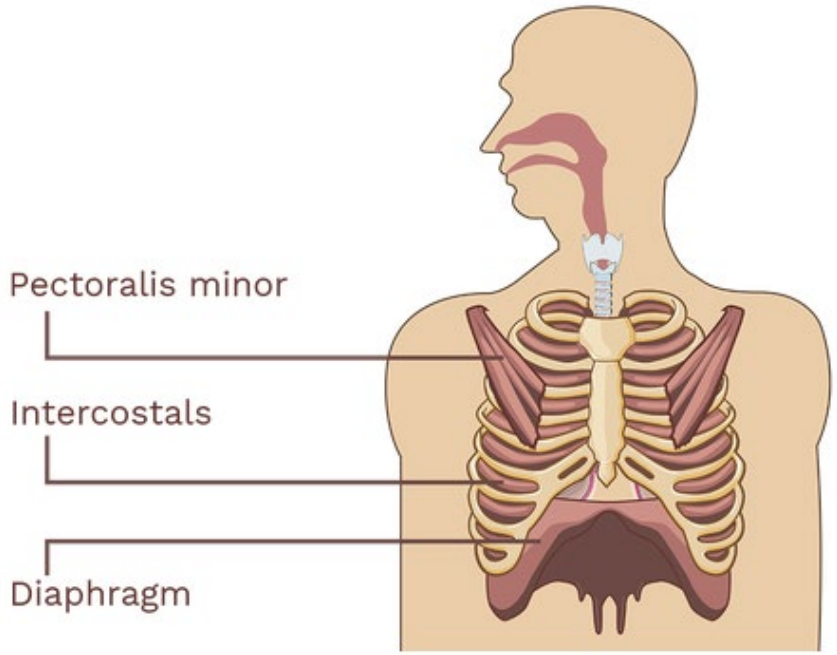
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It is a complex system

- Reactive
- Feed-forward (predictive)
- Tonic

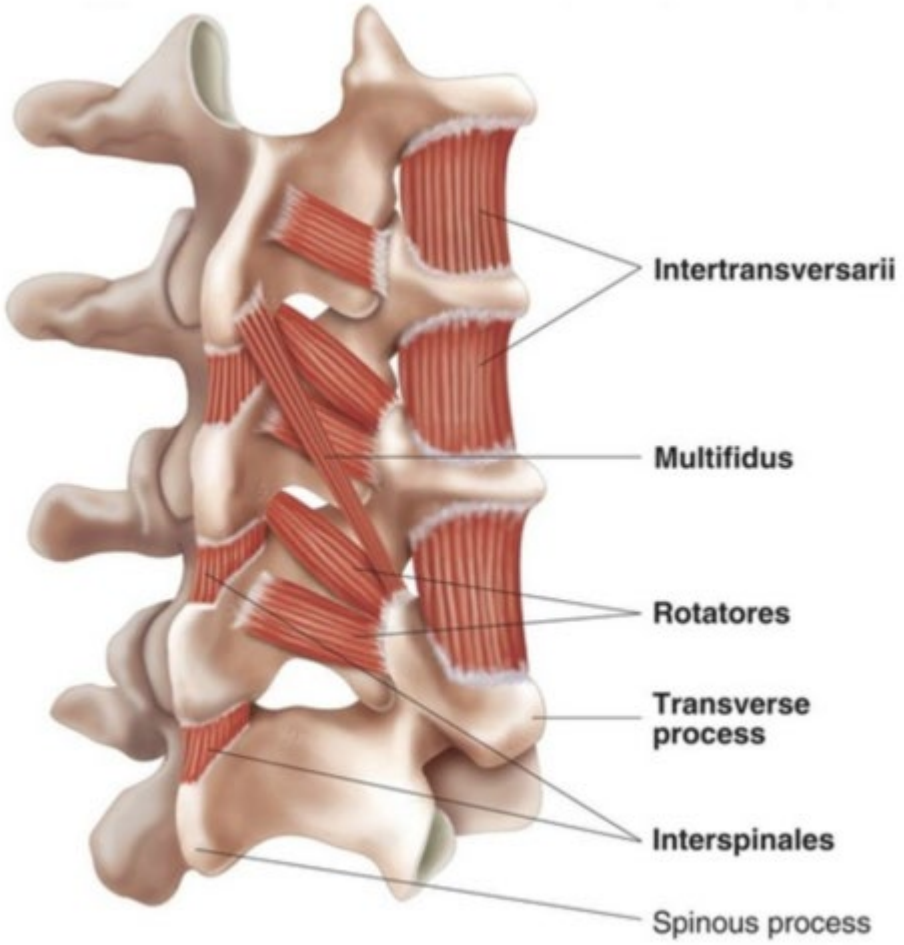


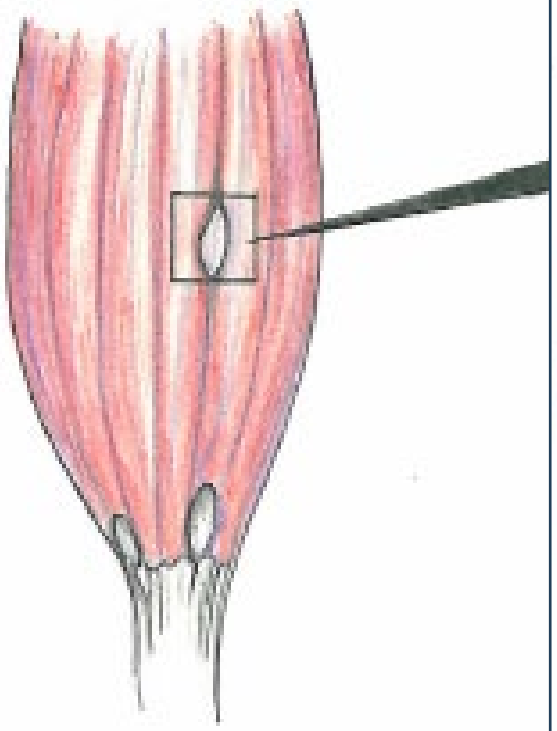


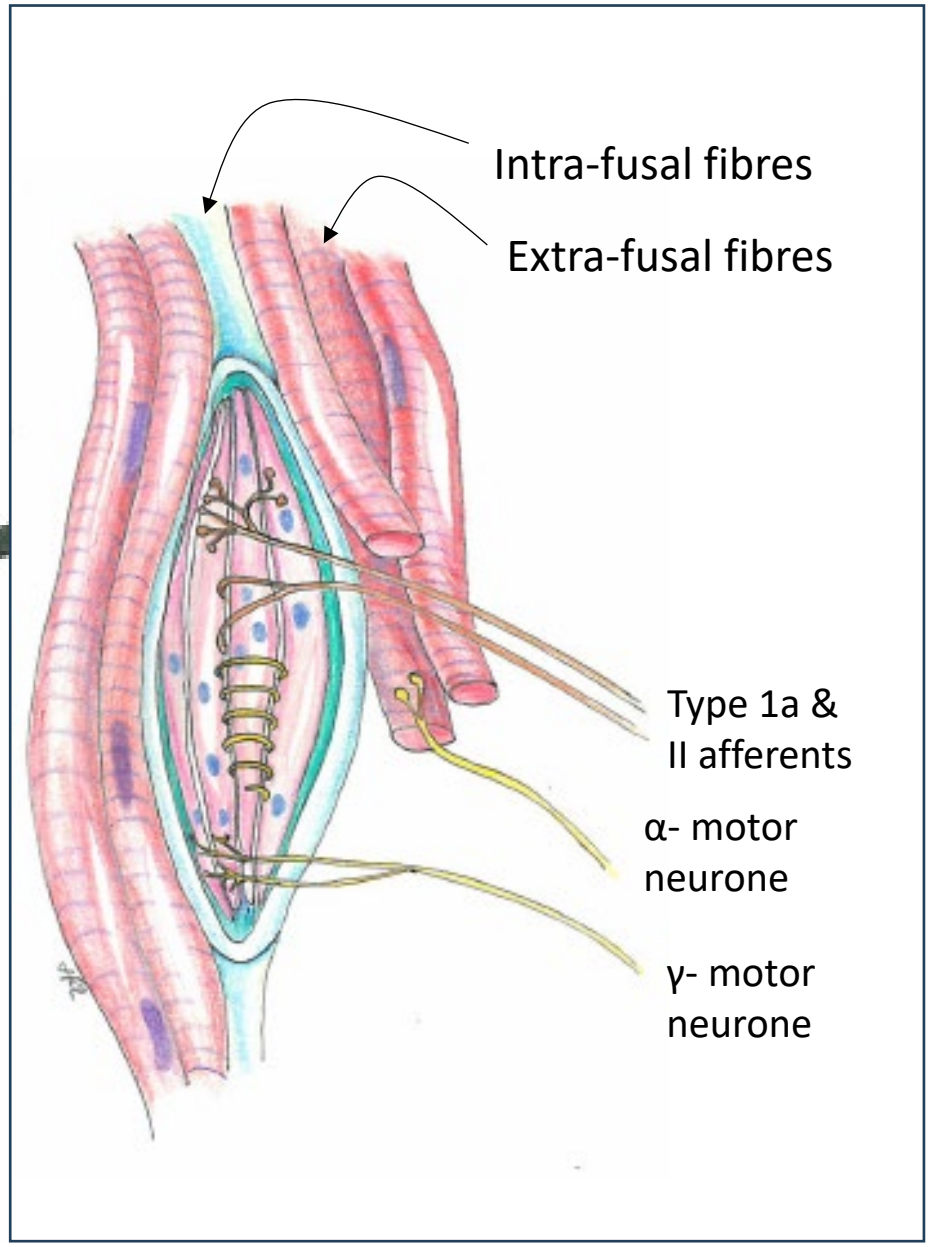


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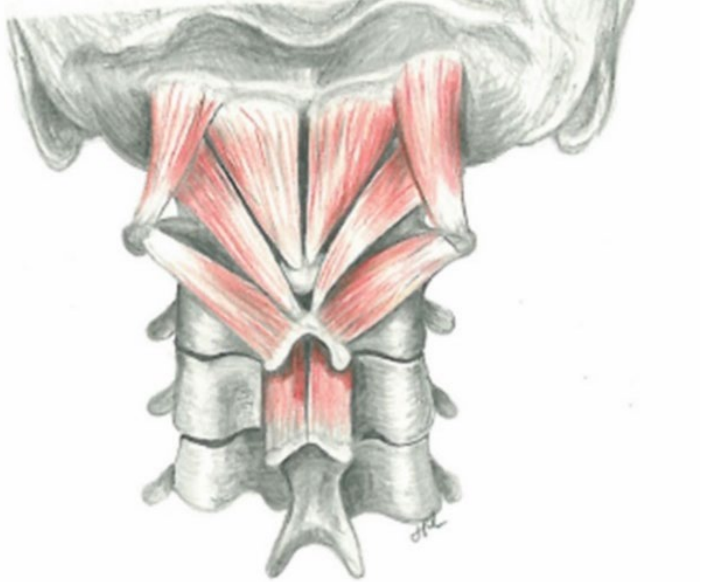
MUSCLE SPINDLES

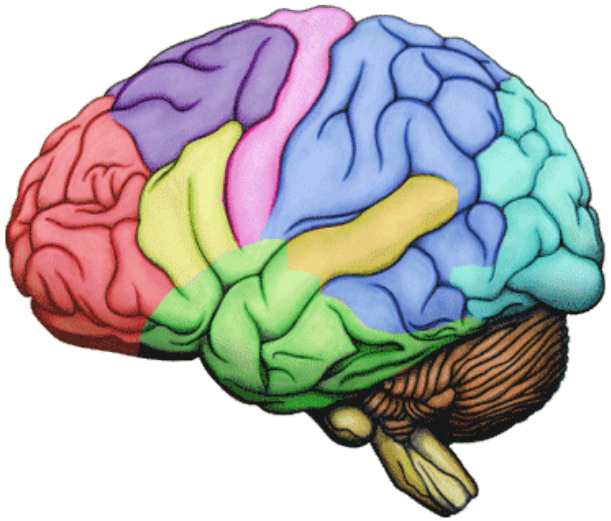






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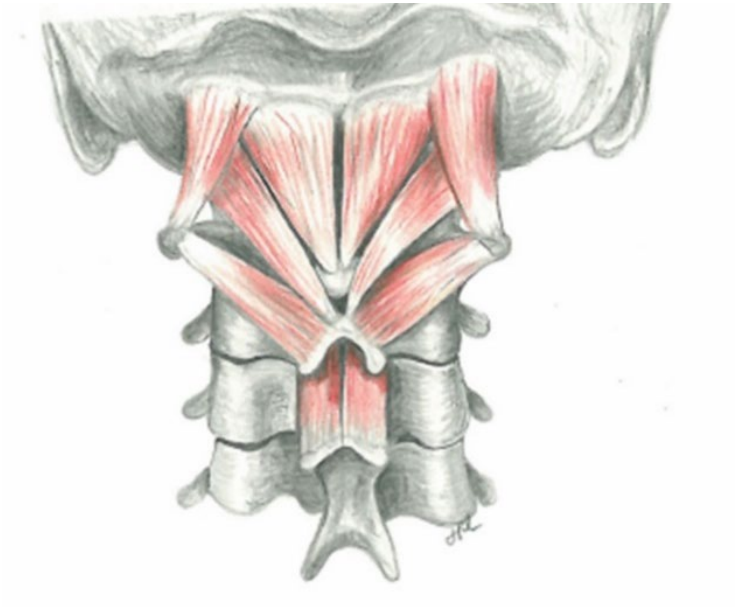


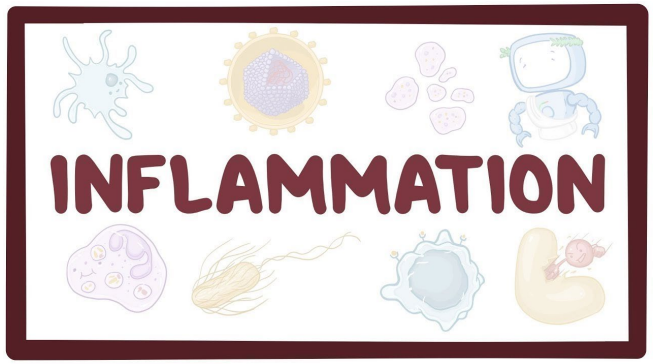
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What can causes vertebral subluxations?









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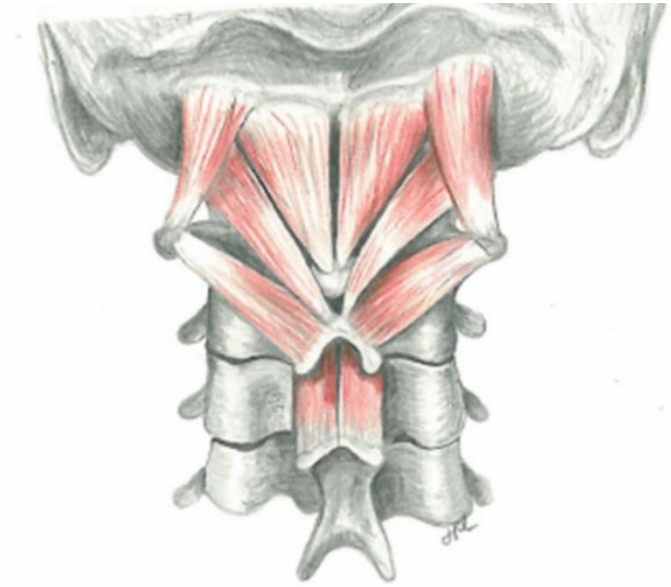


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What happens when the spine dysfunctions?

Subluxated segment deep paraspinal muscles over time become:

- Stiff and Fibrotic
- Atrophied (shrunk)
- Fatty infiltration
- Change fibre type
- Degeneration around joint
- Stretch receptors dysfunction



Deep paraspinal muscles around a ‘healthy’ segment are:

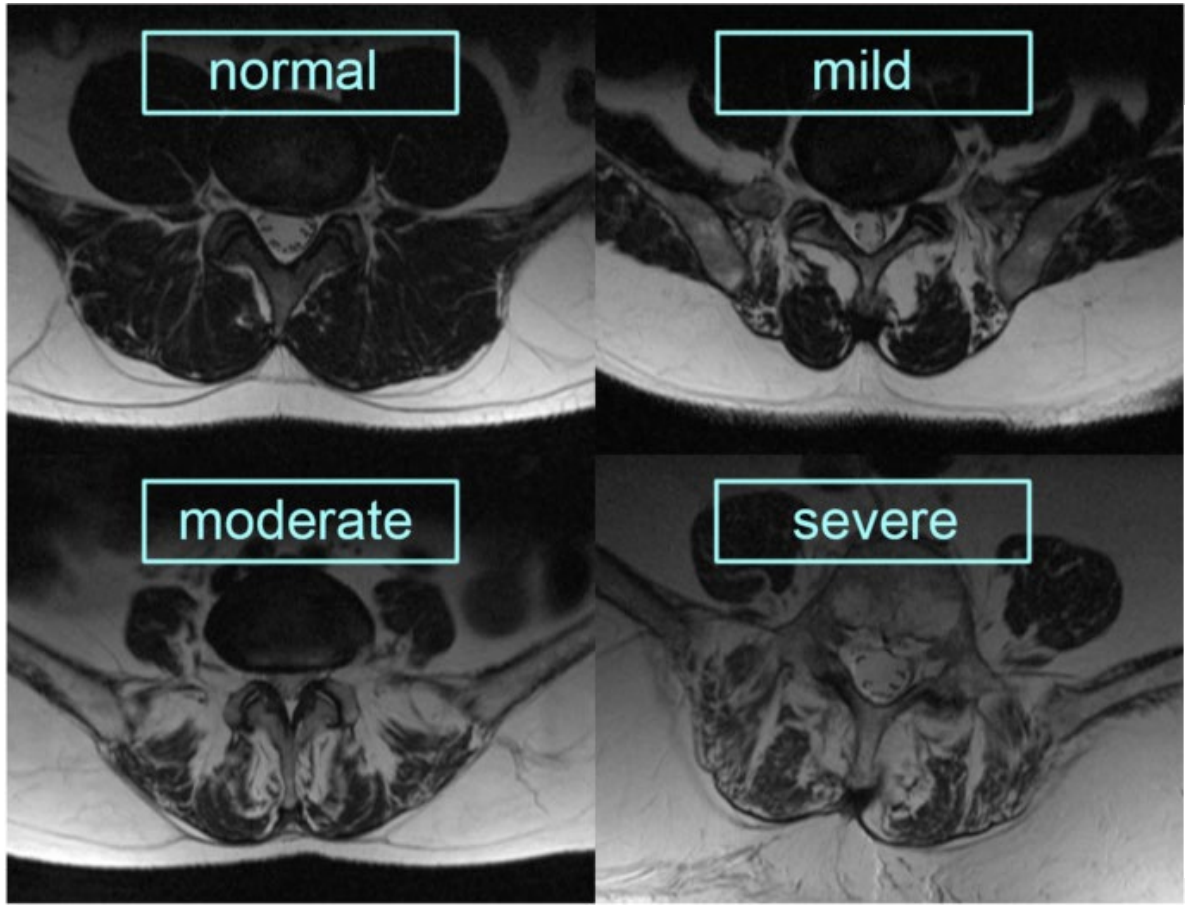
- Plump
- Larger in size
- Slow-twitch fibre type
- No fatty infiltration
- Move freely
- Healthy stretch receptors

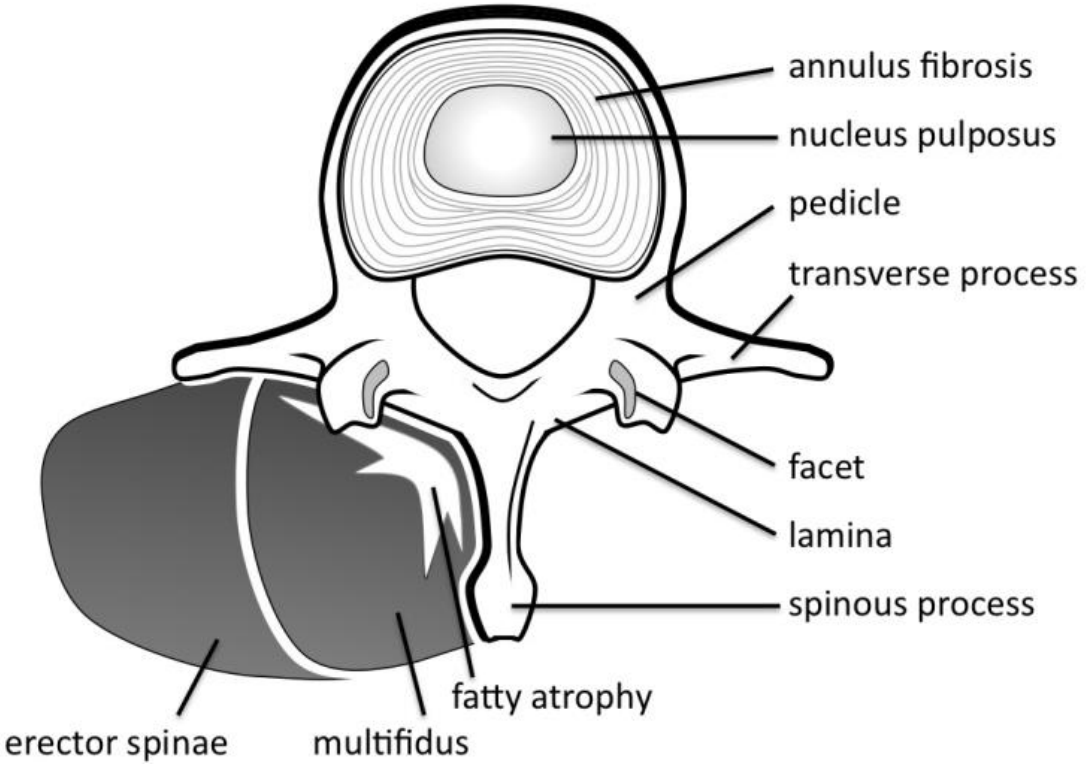
NOT Good

Good

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Faur, C., Patrascu, J.M., Haragus, H. and Anglitoiu, B., 2019. Correlation between multifidus fatty atrophy and lumbar disc degeneration in low back pain. BMC musculoskeletal disorders, 20(1), pp.1-6.

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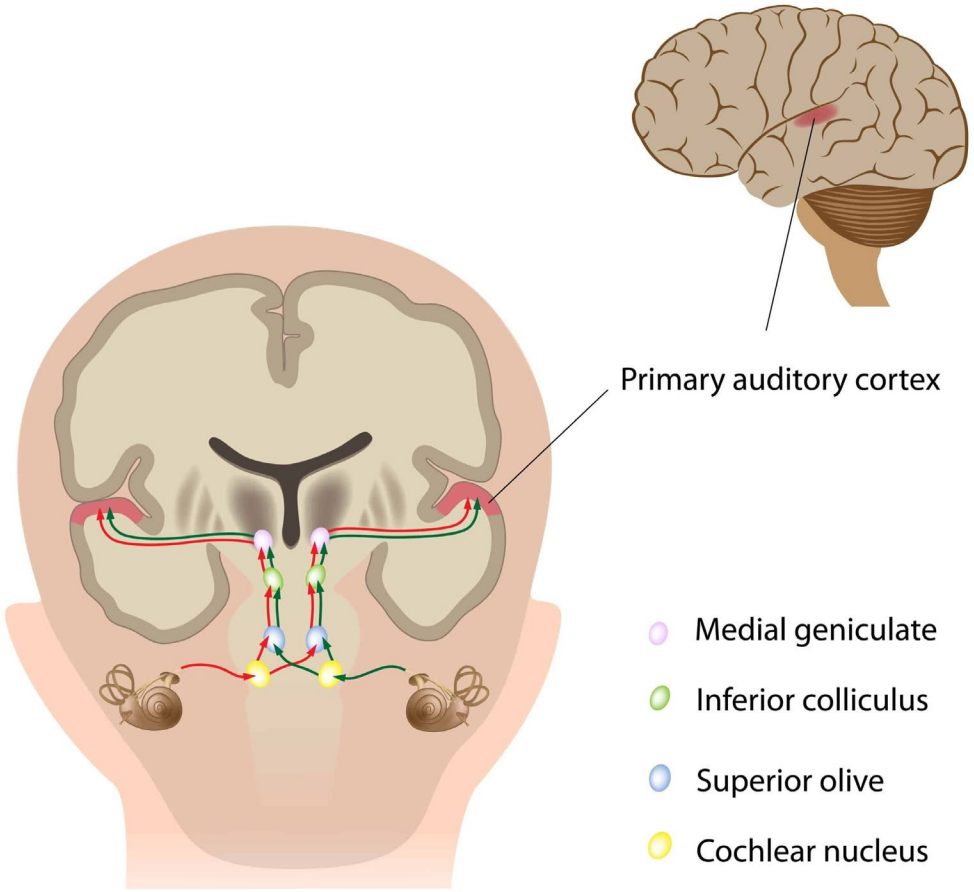


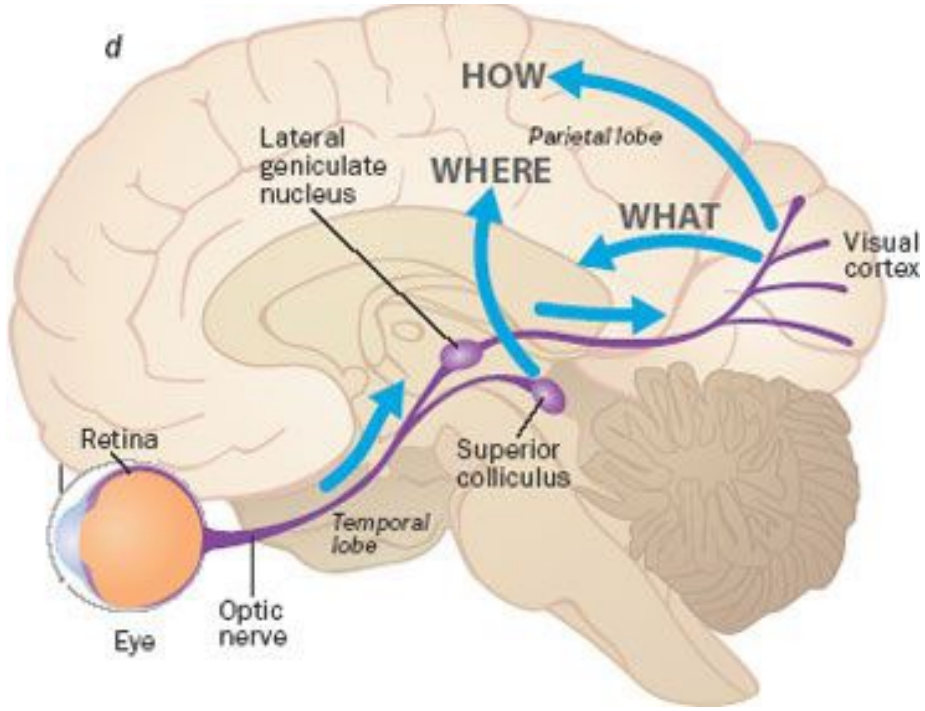




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Interpreting sound and visual information



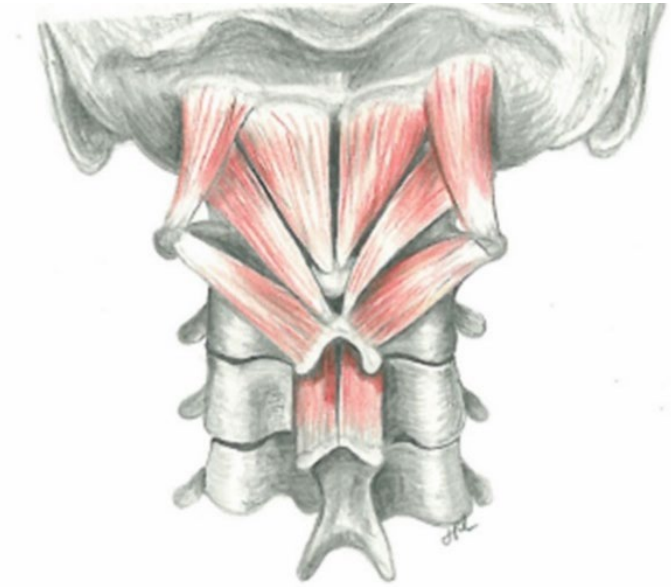


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NOT Good

Good

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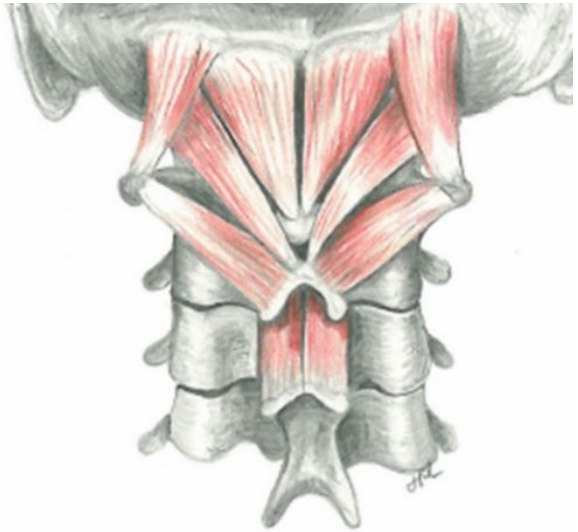
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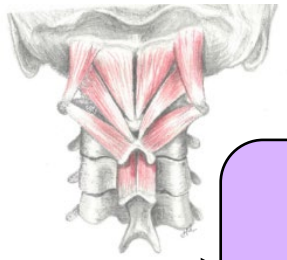








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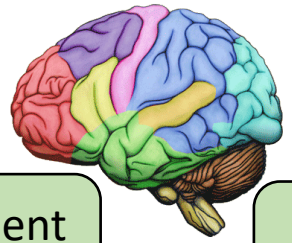




Altered paraspinal muscle proprioception

Predicted sensory feedback from intended movement

Integration of predicted vs actual sensory feedback

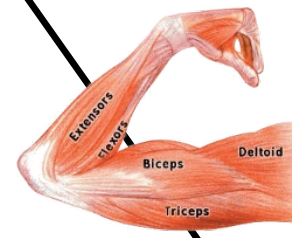


Movement intention

Movement plan

Motor command

Movement coordination and execution centres

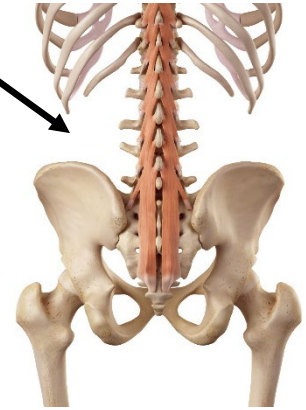


Muscles

Stress
Fear
Pain



Feedforward postural control of vertebral column

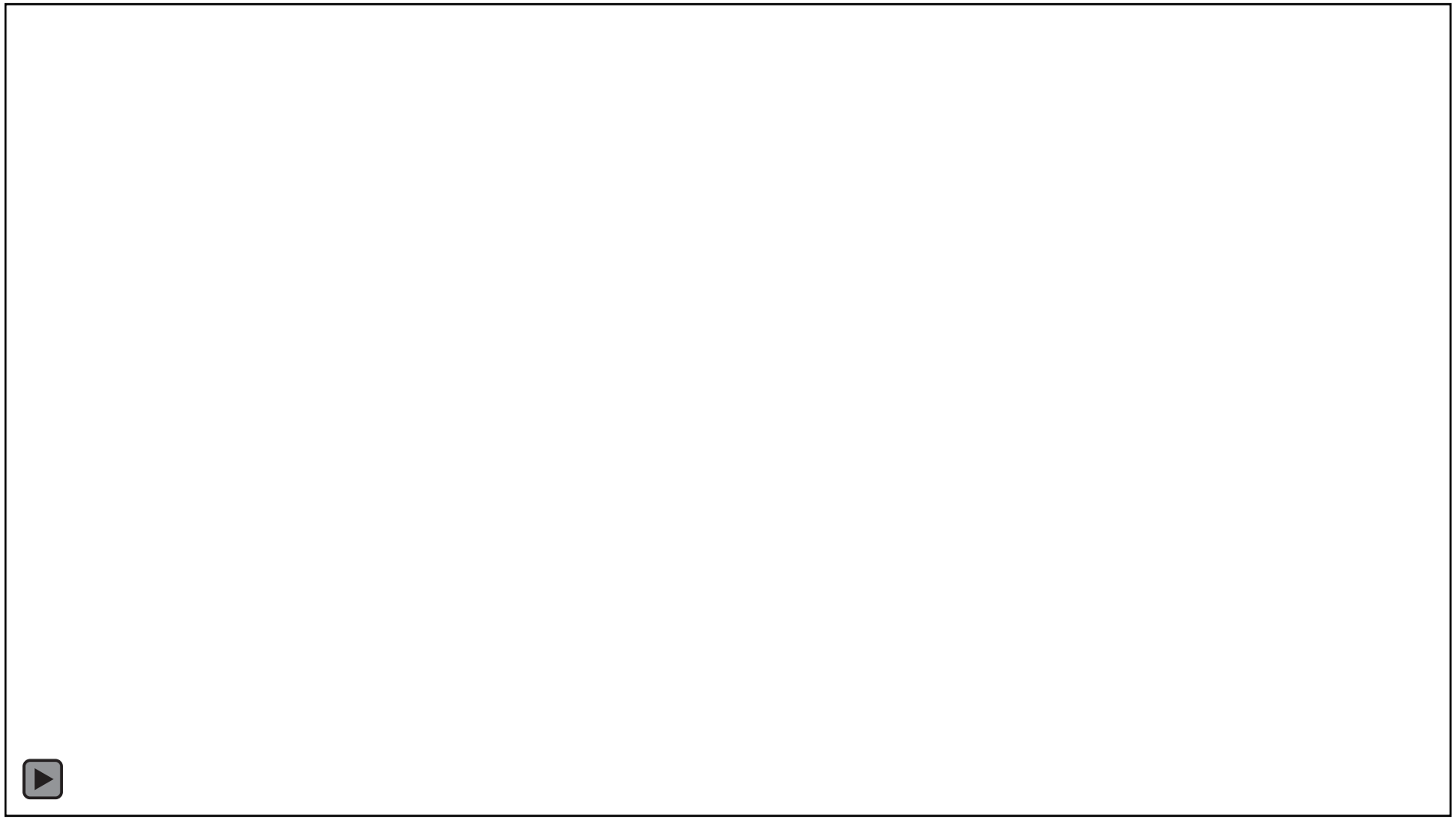


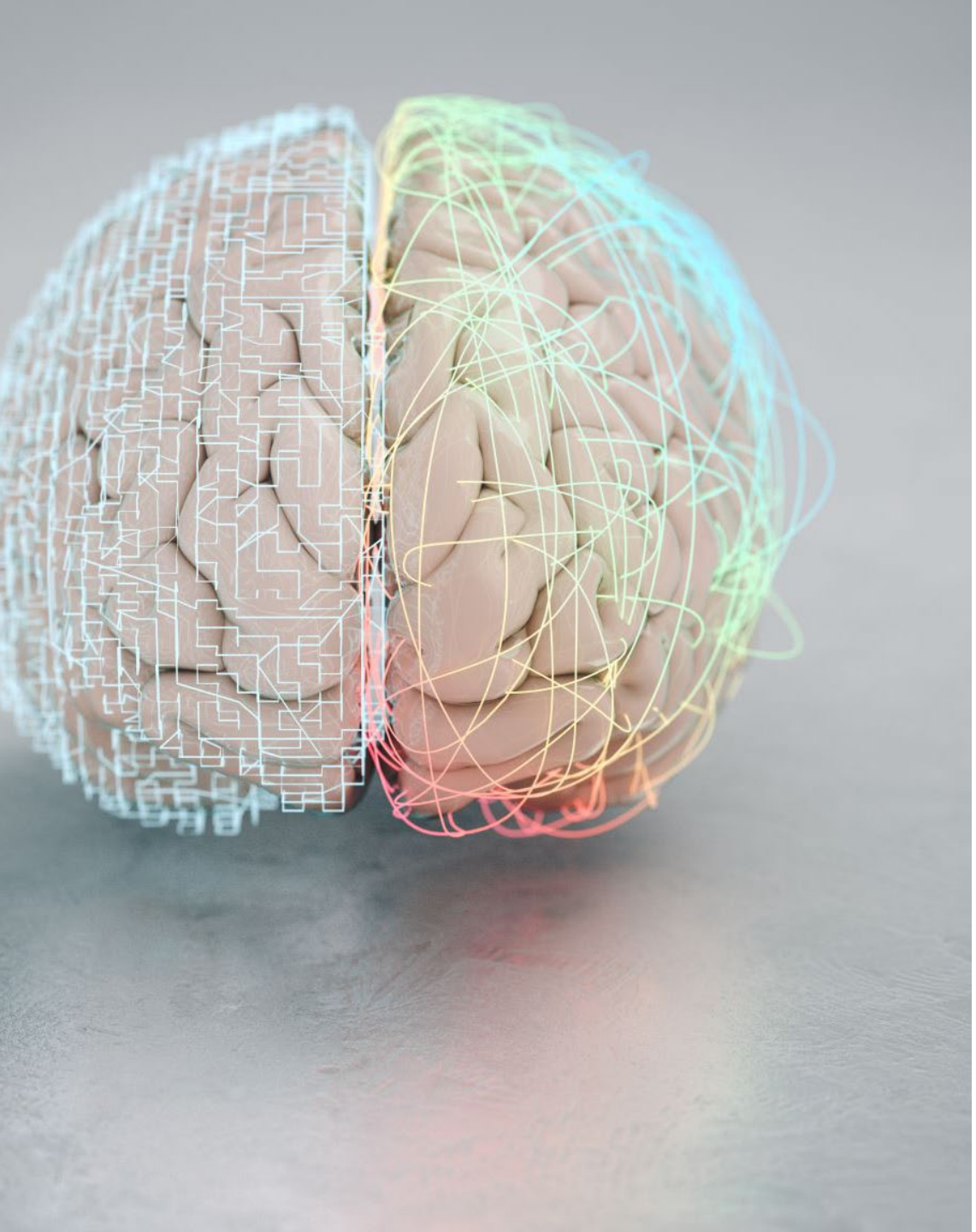
Haavik, H., et al., European Journal of Applied Physiology, 2021: p. 1-46.

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Microtrauma





The Short Version

"Research indicates that chiropractic care enhances brain-body communication, allowing your brain to more accurately interpret internal and external signals. This improved perception of what is happening inside you and around you enables your brain to optimize bodily functions and adapt more effectively to your environment."

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Problems and symptoms build up over time!











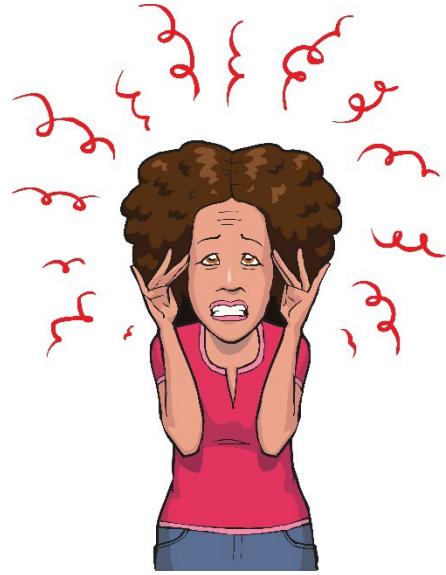










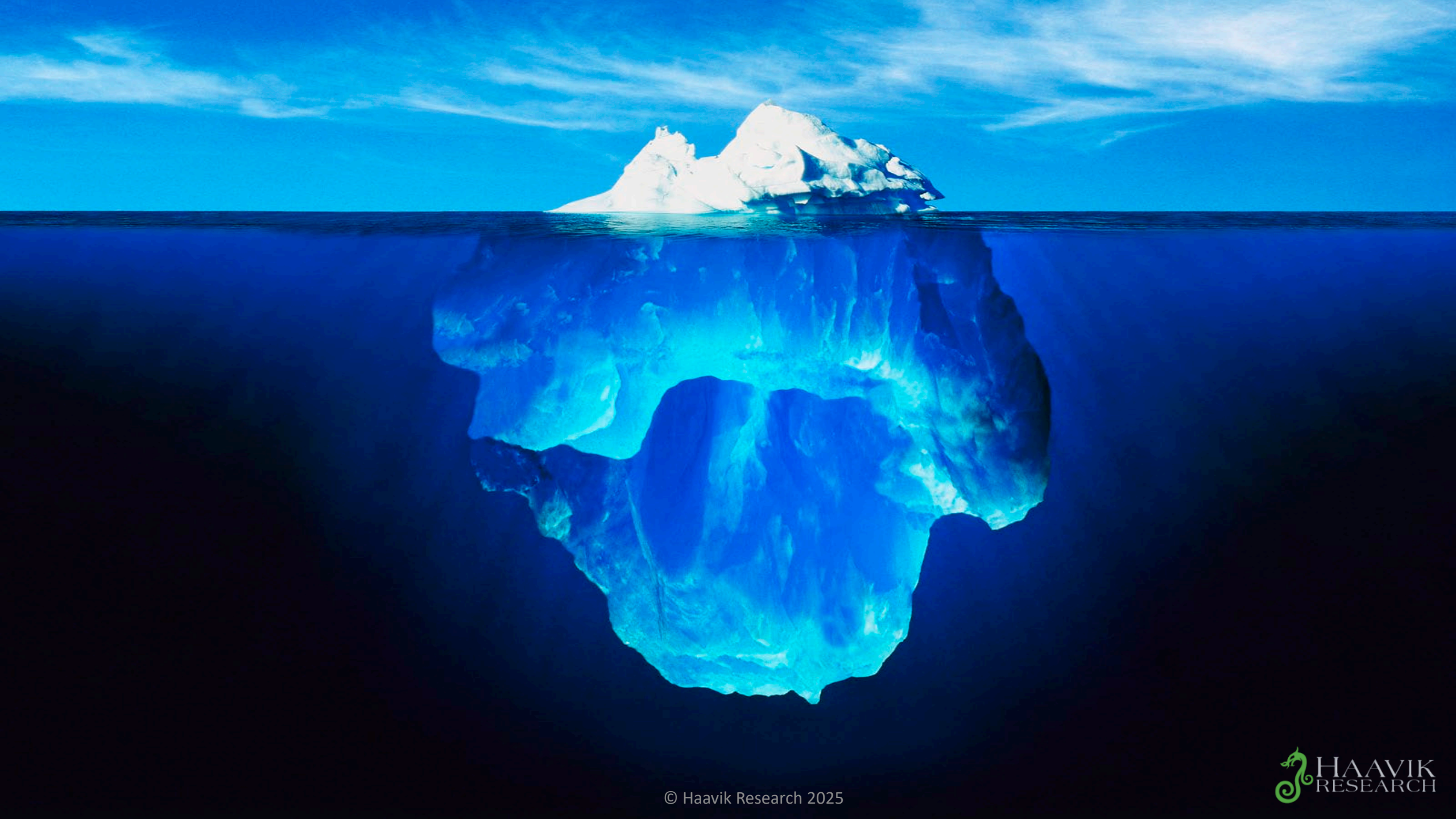








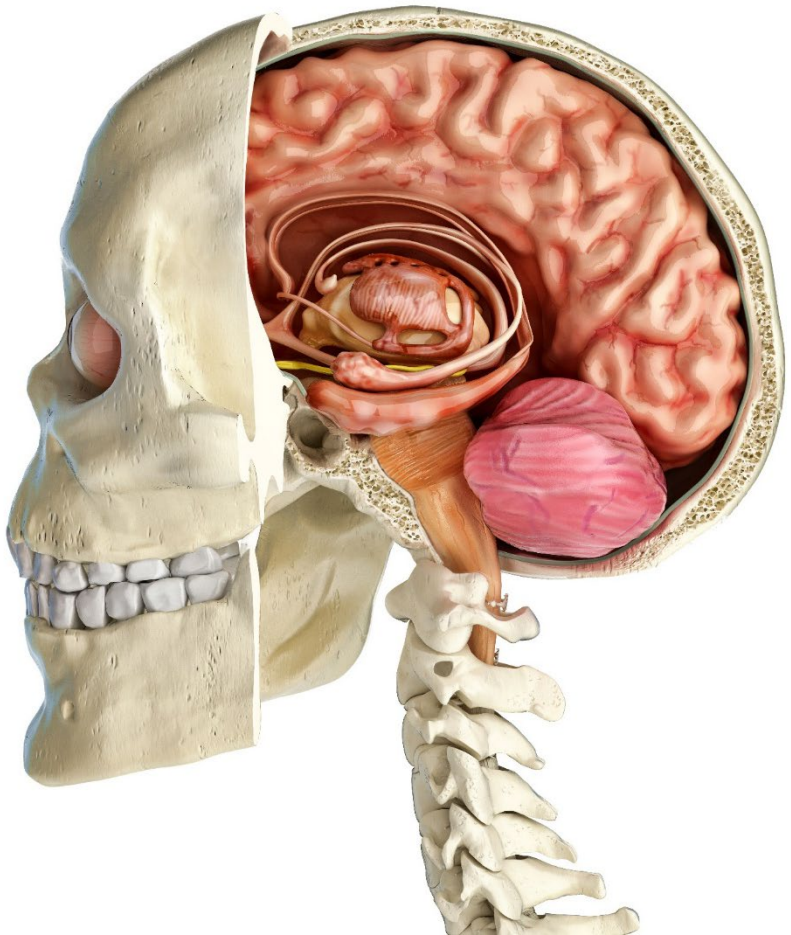
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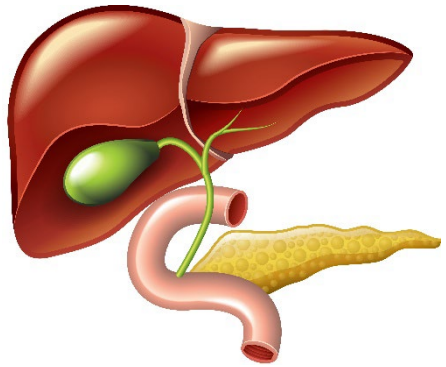


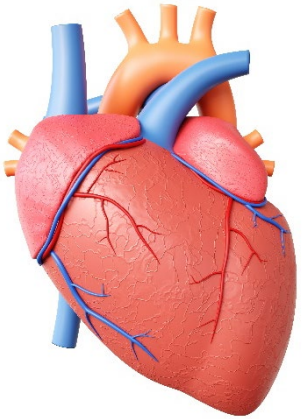
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So according to the BRAIN model
How might chiropractic care alter organ physiology?

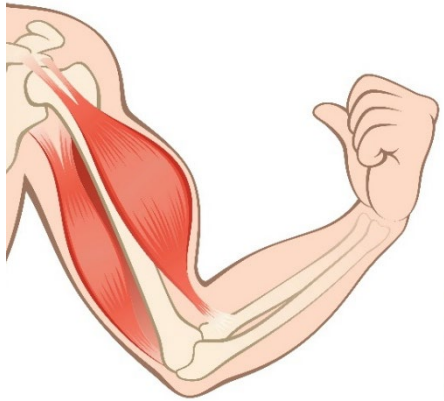


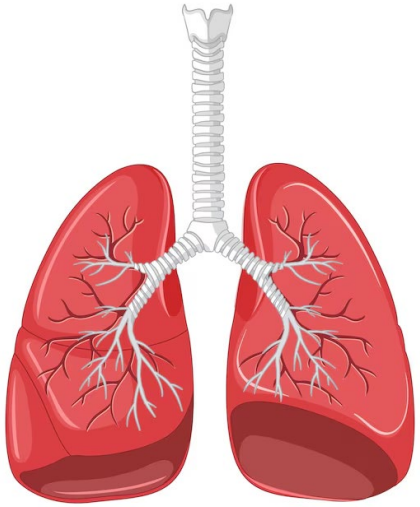




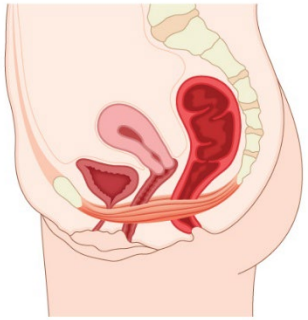








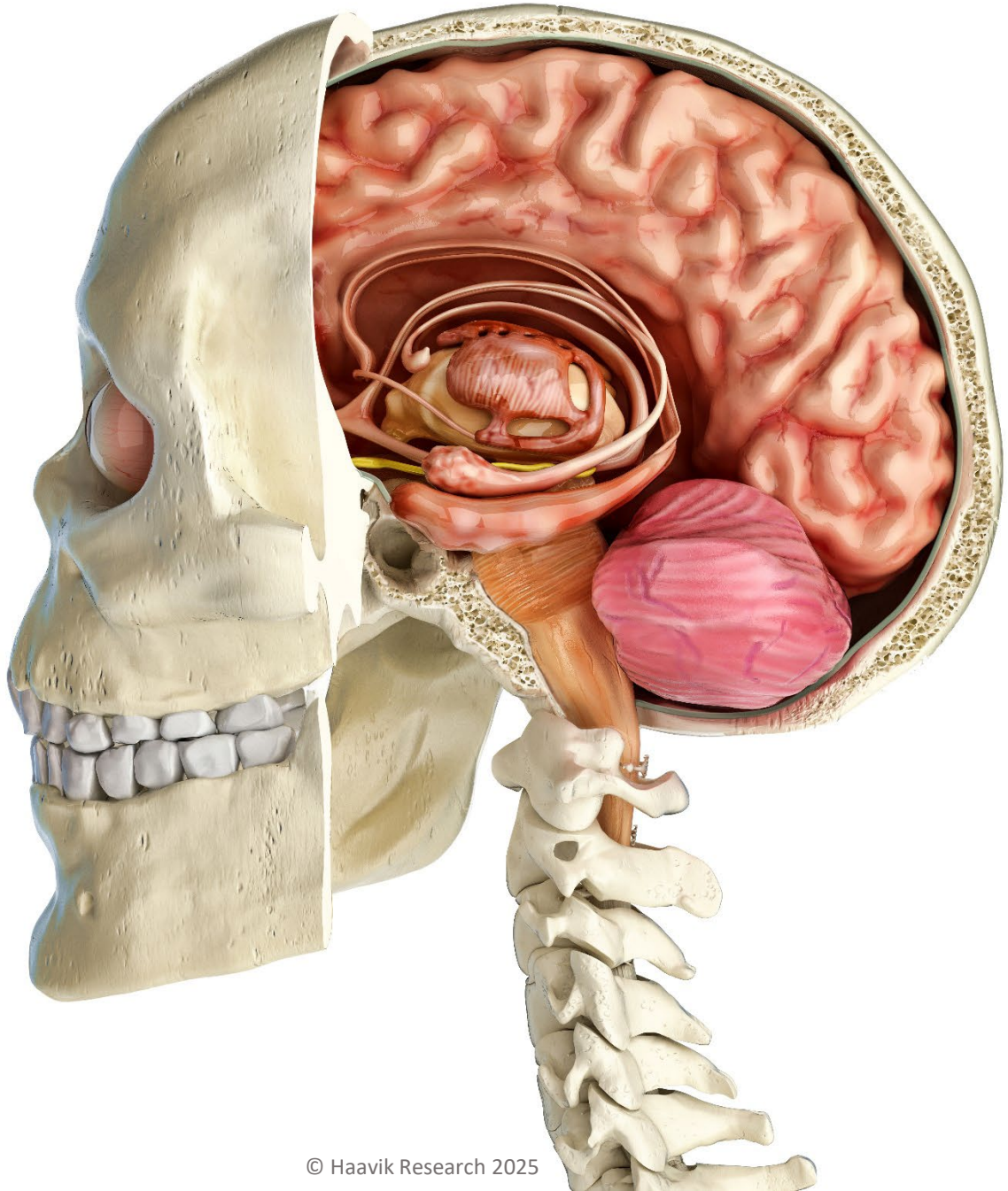




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Lack of clinical trials about organ function





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Mechanisms Brain - Body Communication

- **1. Autonomic Nervous System (ANS)**
  - Sympathetic nervous system (SNS) – "fight or flight“
  - Parasympathetic nervous system (PNS) – "rest and digest"

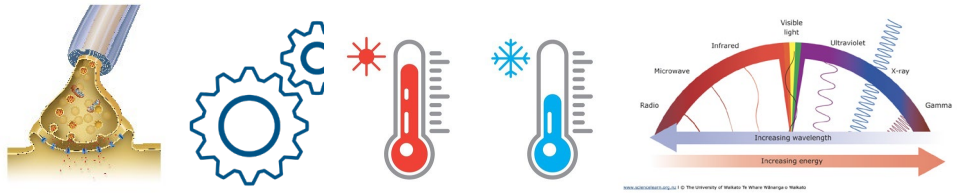
These systems send and receive signals to and from organs using neurotransmitters like acetylcholine and norepinephrine.

- **2. Endocrine System Regulation**
  - The brain (especially the **hypothalamus**) controls hormone release via the **pituitary gland**.
  - Hormones regulate various organs, such as the **adrenal glands**, which release cortisol during stress.
  - Hypothalamus Pituitary Thyroid; Hypothalamus Pituitary Gonads; Hypothalamus Pituitary Adrenals

- **3. Reflex Loops & Direct Neural Control**
  - **Spinal cord** can mediate reflexes (e.g., pulling away from pain), bypassing the brain for quick reactions; some reflex loops go via the brain as well.
  - Voluntary neural control (e.g. muscles; bearing down; voiding bladder, etc)

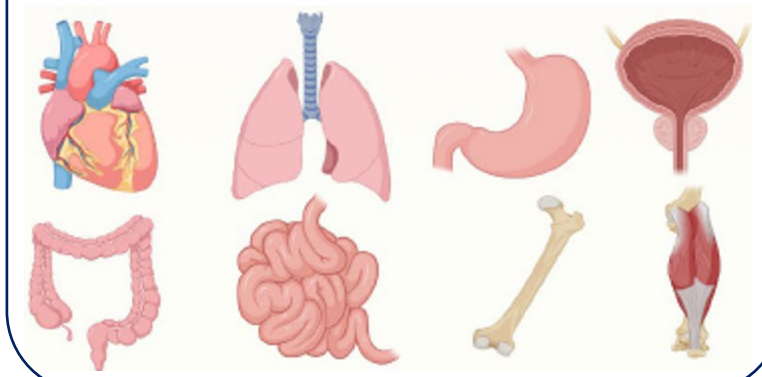
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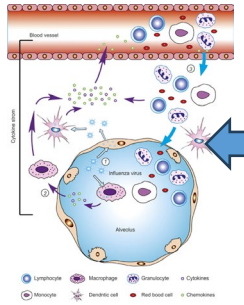
Interoception - Central Integration

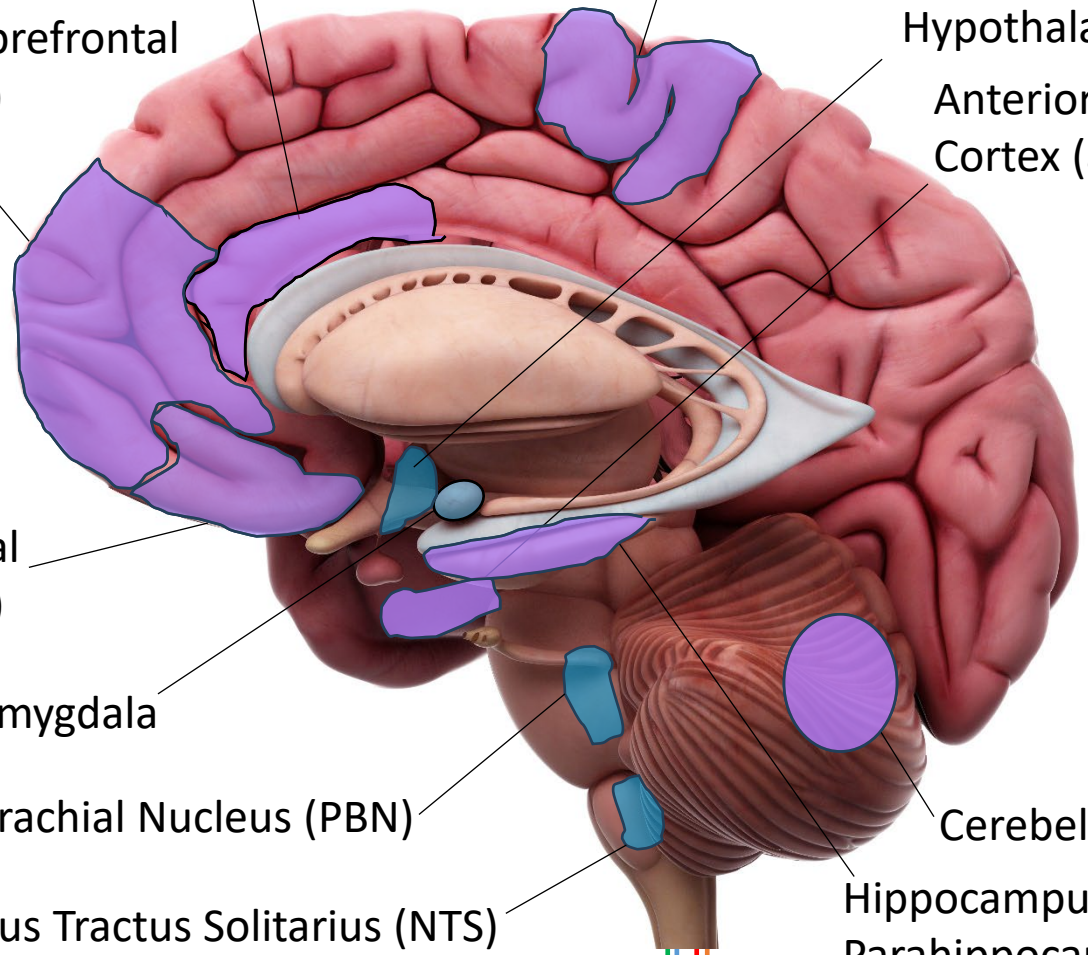


Biochemical, Mechanical, Thermal or Electromagnetic

Organs







Anterior Cingulate Cortex (ACC)

Sensorimotor

Hypothalamus

Anterior Insular Cortex (aIns)

Ventromedial prefrontal cortex (vmPFC)

Orbitofrontal cortex (OFC)

Amygdala

Parabrachial Nucleus (PBN)

Nucleus Tractus Solitarius (NTS)

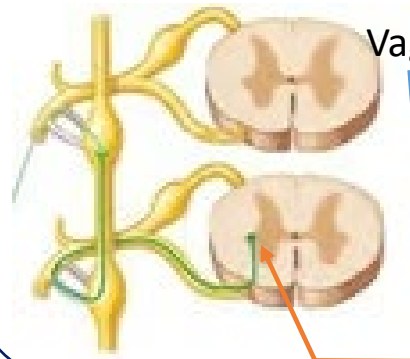
Cerebellum

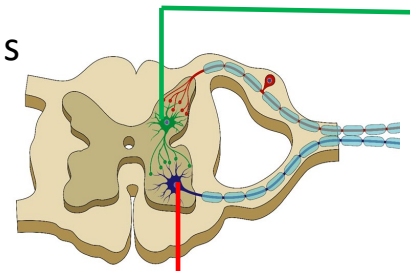
Hippocampus and Parahippocampus

ANS pathways

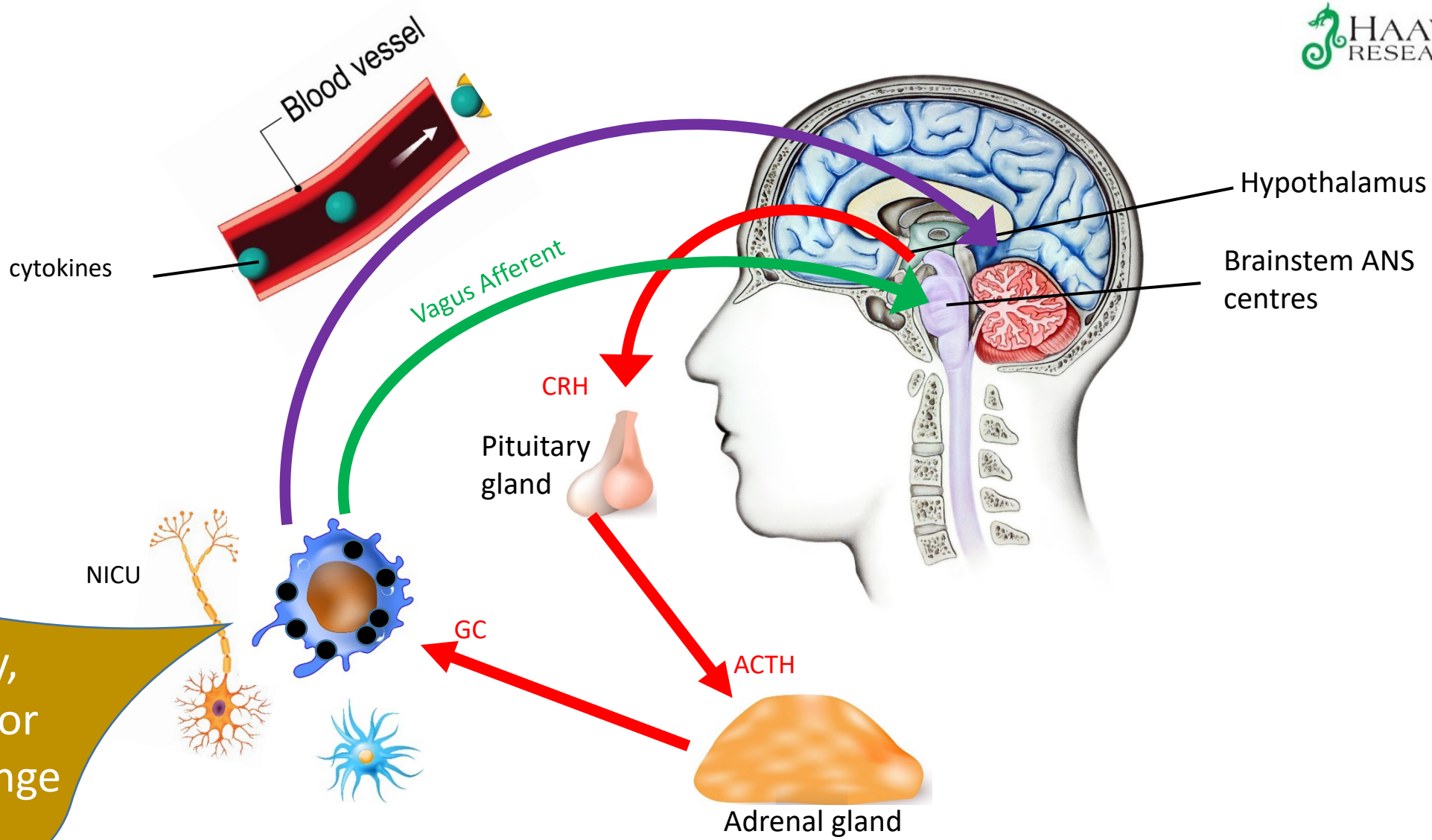
Spinal nerve pathways

Vagas





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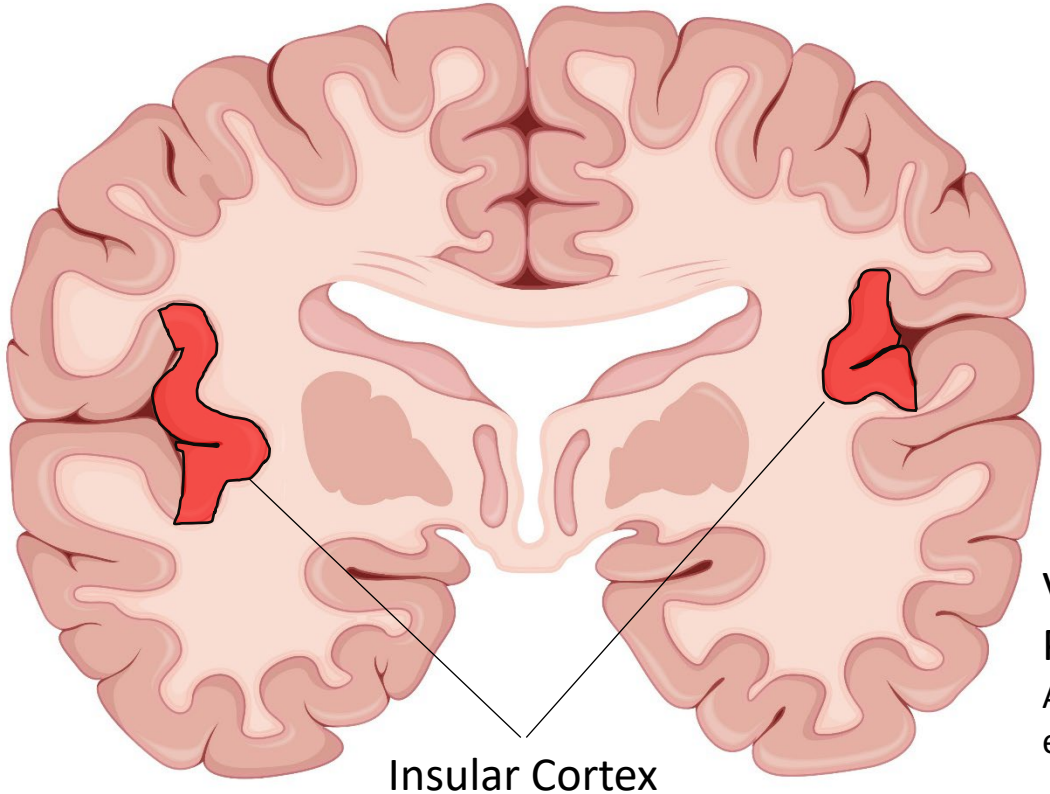
Infection, Injury, Trauma, Stress or Immune challenge

NICU	neuro–immune cell unit
CRH	corticotrophin releasing hormone
ACTH	adrenocorticotropin hormone
GC	glucocorticoids (cortisol & cortisone)
Vagus	Afferent parasympathetic sensory

[References 2-14]

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Some Brain Regions known to activate ANS & NeuroEndocrine Systems?



Insular Cortex
Processes Interoception
Controls ANS

Anterior Cingulate Cortex
Generates visceral motor predictive signals of the body's internal milieu

Sensorimotor Cortex

Hypothalamus
Master regulator of the ANS

Amygdala
Threat detector; alters ANS and Hypothalamus – pituitary gland

Cerebellum
Can alter ANS and pituitary

Ventral Medial Prefrontal Cortex
ANS responses to emotions

Pituitary
Hormone release

Brainstem
Breathing, heart rate, digestion

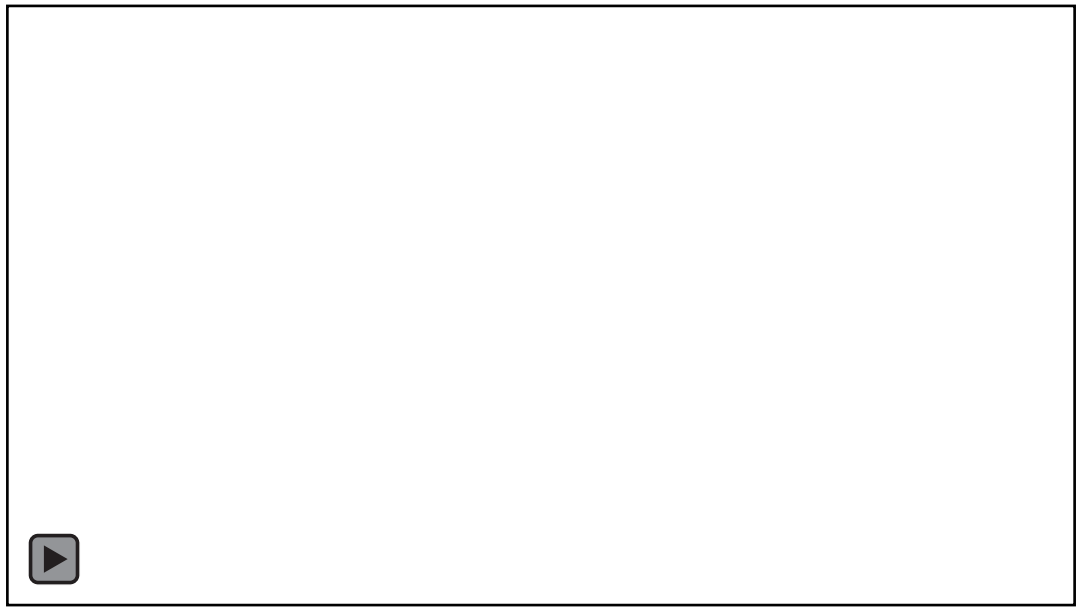
Hippocampus & Parahippocampus
Creating, retrieving and altering memory and, interoceptive learning

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How does chiropractic alter emotional resilience?

"A recent clinical trial has shown that 4 weeks of chiropractic care can reduce not only pain, but also reduce anxiety, depression and fatigue by changing brain conversations"

Heidi Haavik

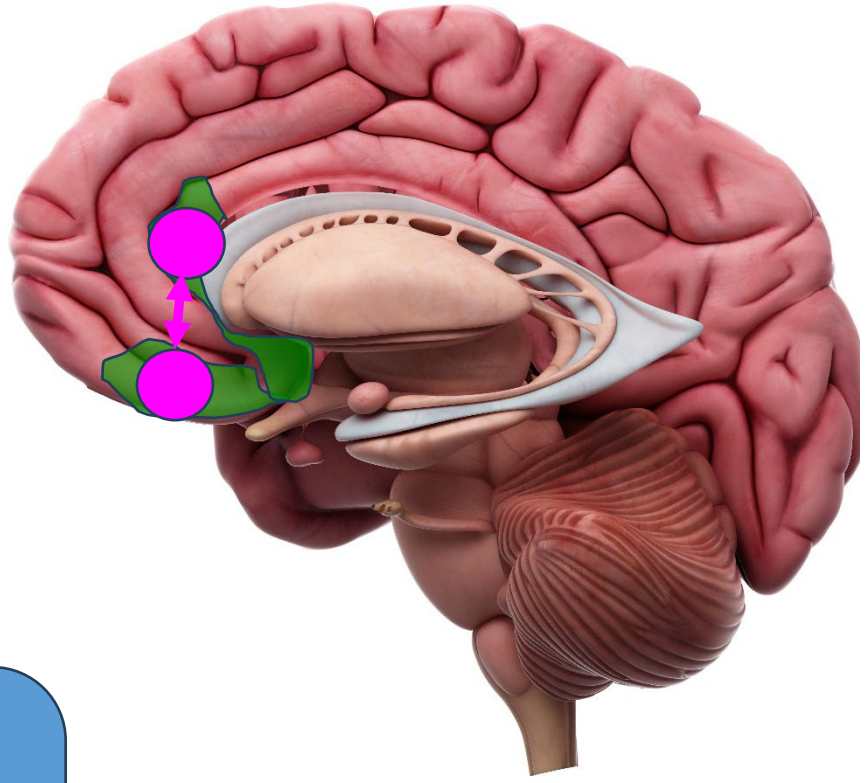


(Haavik et al 2024, Brain Sciences)

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Medial orbitofrontal cortex

- Processing information about own mental states, beliefs, intentions and desires
- Introspection
- Construction of the narrative sense of self
- Is activated by rewarding and subjectively pleasant stimuli
- Imagines future events



Anterior Cingulate Cortex

- Recognizing, understanding and regulating own emotions
- Appraising Interoceptive signals (visceral, emotions, pain sensations)
- Driving physical arousal
- Descending pain inhibitory pathway

Medial Orbitofrontal Cortex is known to have reduced functional connectivity in people with depression

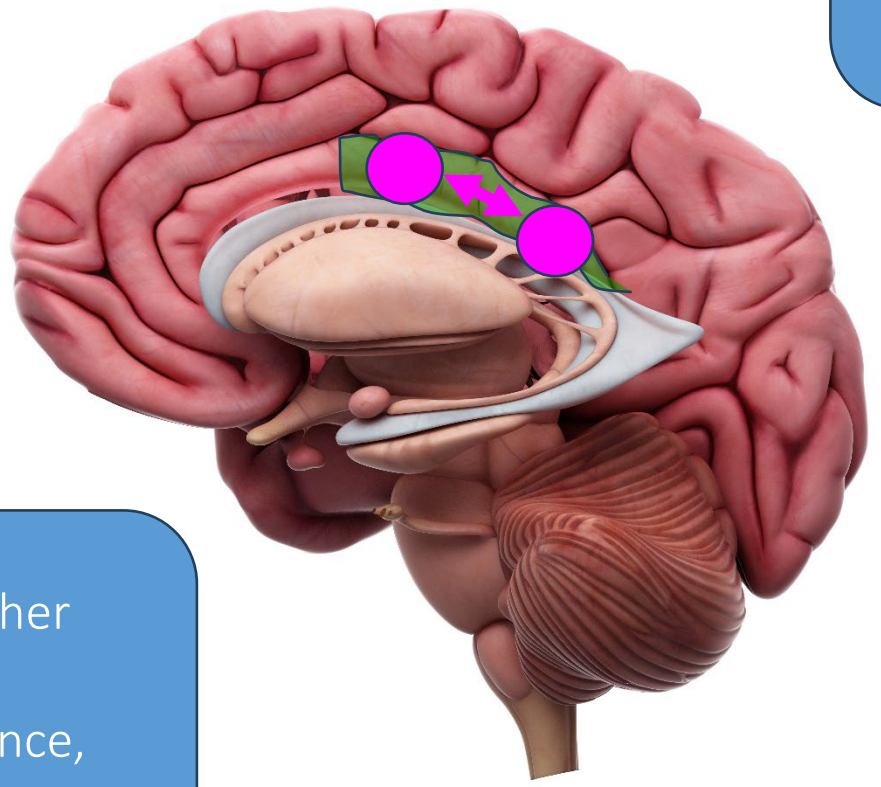
HAAVIK RESEARCH

(Haavik et al 2024, Brain Sciences)

ACC is known to have abnormal functional connectivity in people with chronic pain, depression and anxiety.

The Posterior Cingulate Cortex

- internally focused, self-referential processing
- construction of the narrative sense of self, including autobiographical memories



In depression there is asymmetry in the thickness of PCC
(↑ cortical thickness in left vs right)

Depressed individuals with higher somatic symptoms (e.g. sleep disturbance, appetite disturbance, and fatigue or loss of energy) have greater asymmetry in PCC thickness

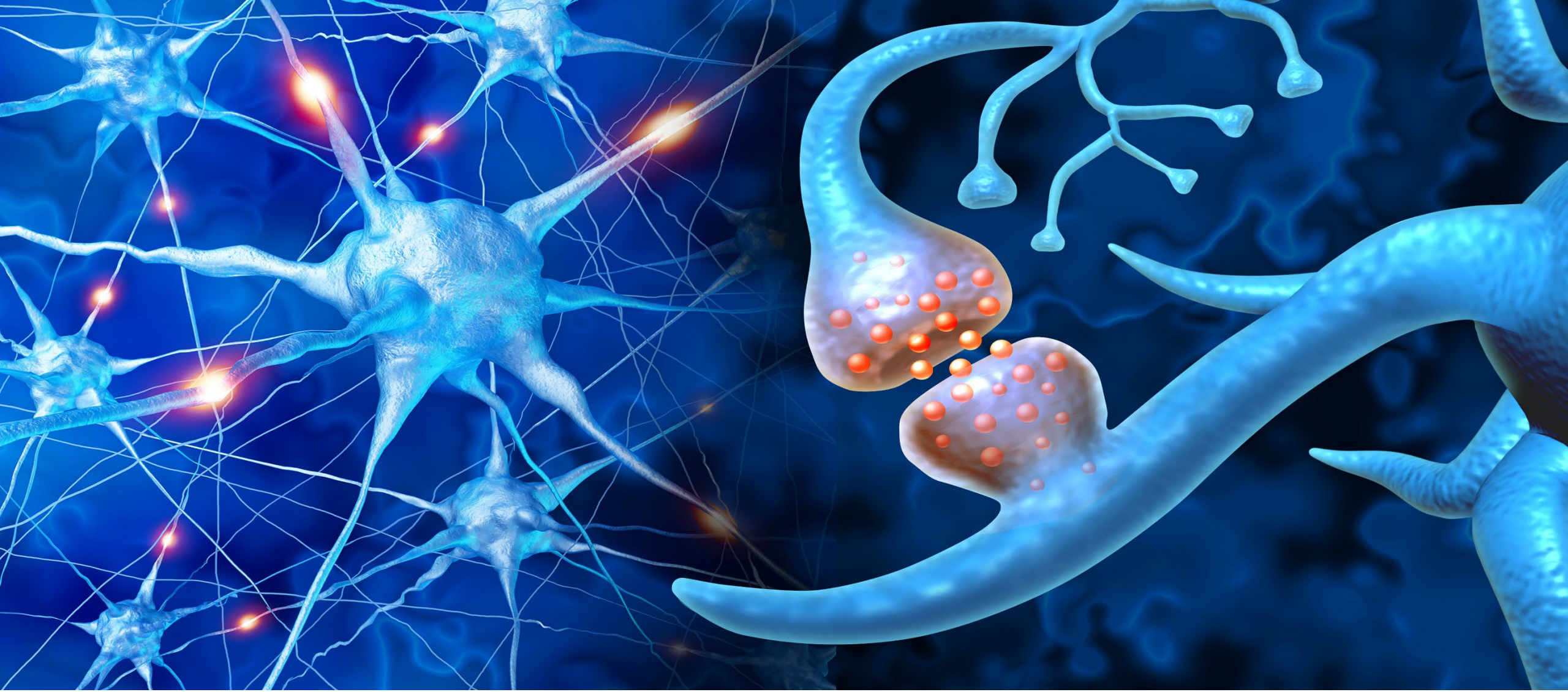
HAAVIK RESEARCH

(Haavik et al 2024, Brain Sciences)





This is where your chiropractor can help



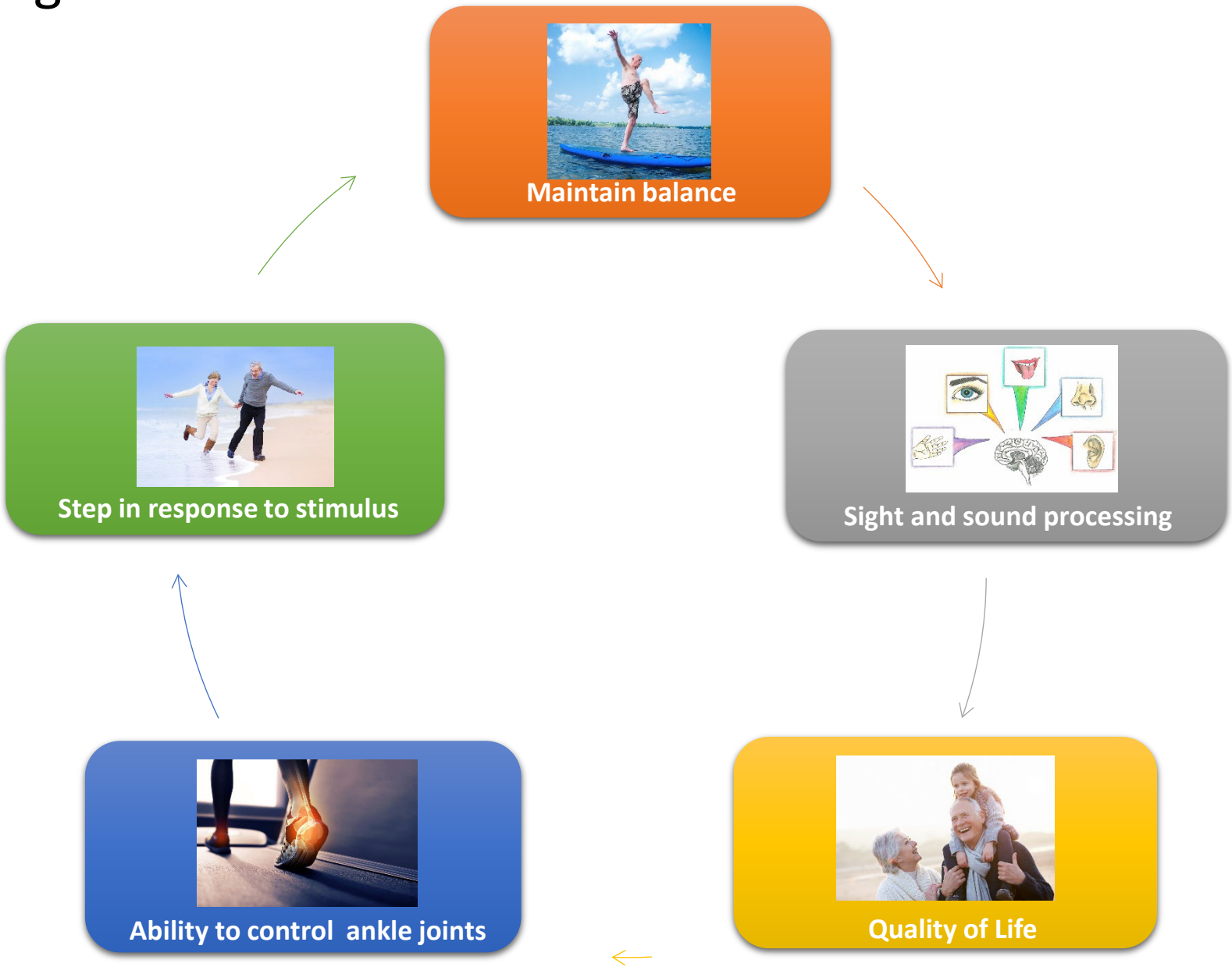
Some changes in the brain take longer

HAAVIK RESEARCH

Holt, K., Haavik, H., Lee, A.C.L., Murphy, B., & Raina Elley, R. (2015) Effectiveness of chiropractic care to improve sensorimotor function associated with falls risk in older people: A randomized controlled trial. Journal of Manipulative and Physiological Therapeutics. May;39(4):267-78. doi: 10.1016/j.jmpt.2016.02.003.

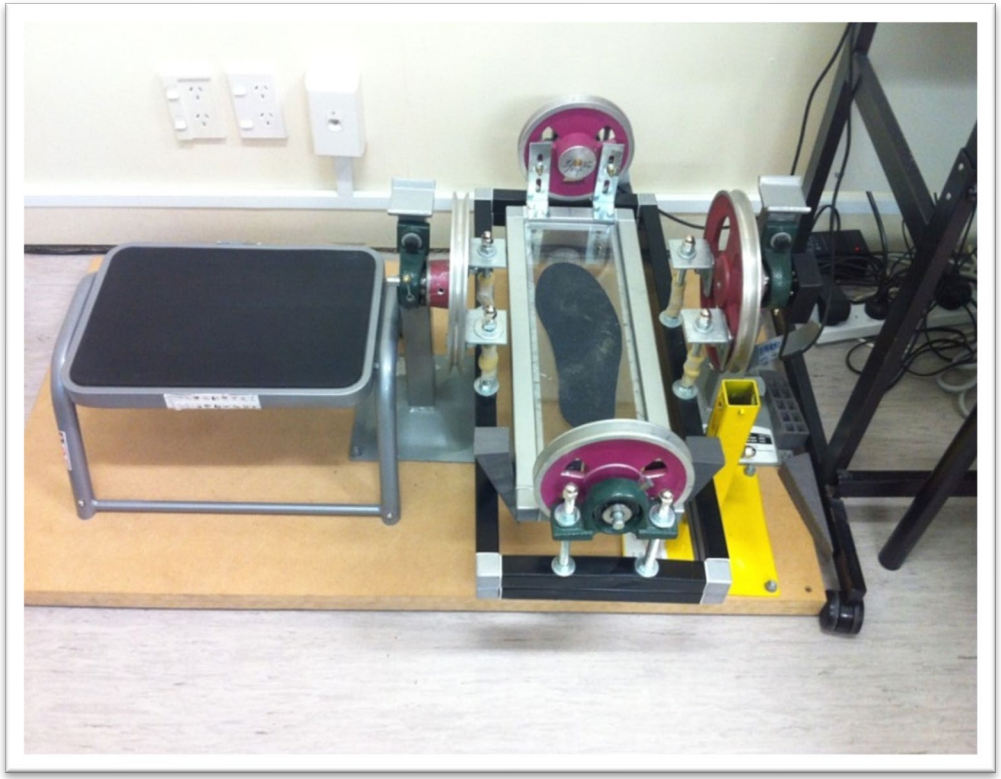
60 older adults living at home

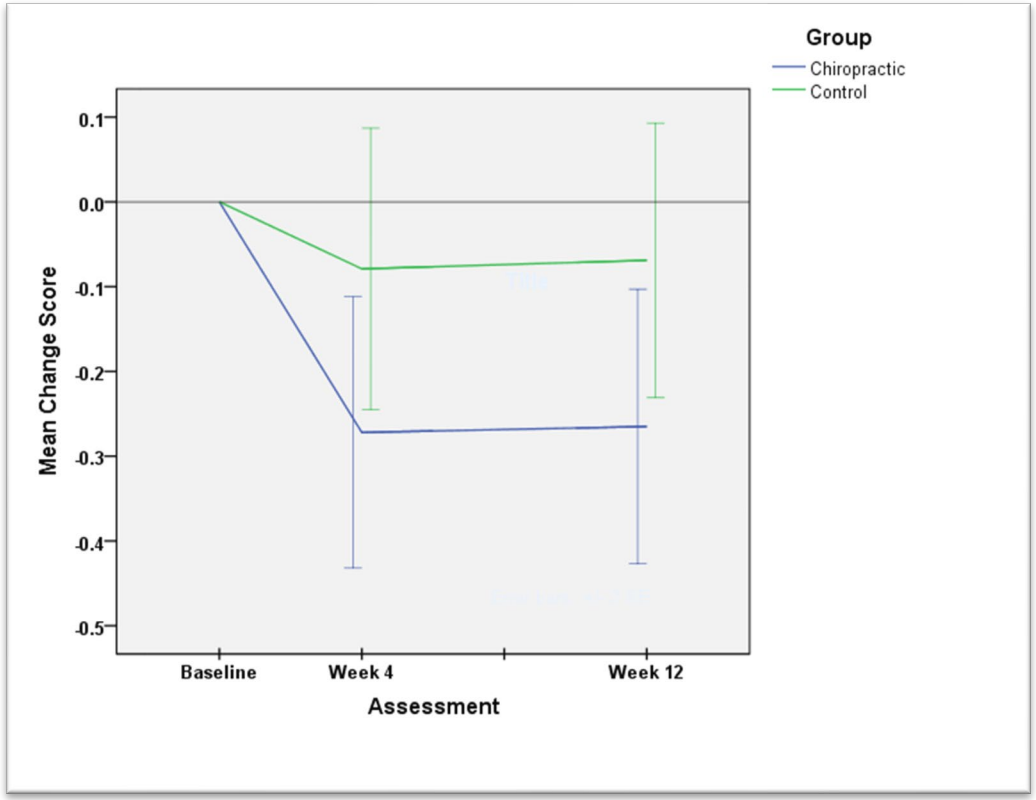
We recorded at:
Baseline
After 4 weeks
After 12 weeks



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Improved ankle joint position sense

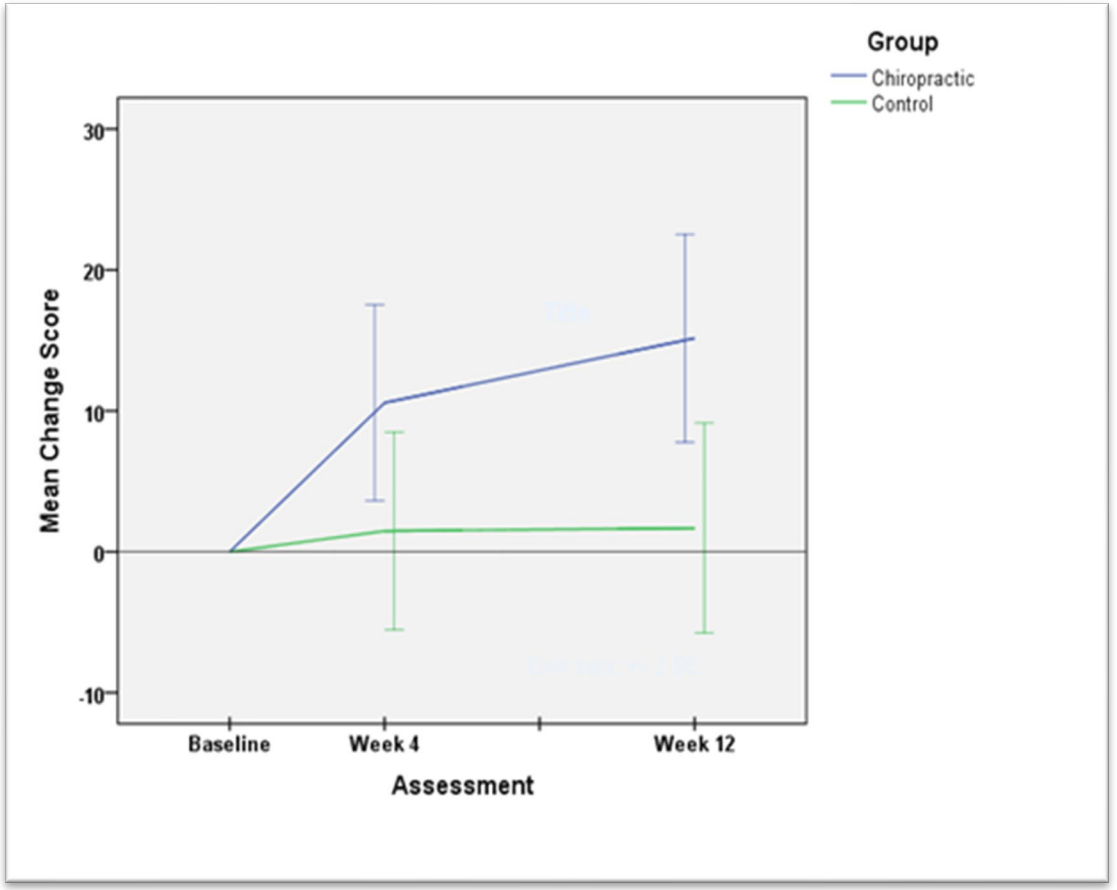




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Improved interpretation of sound and visual information at the same time

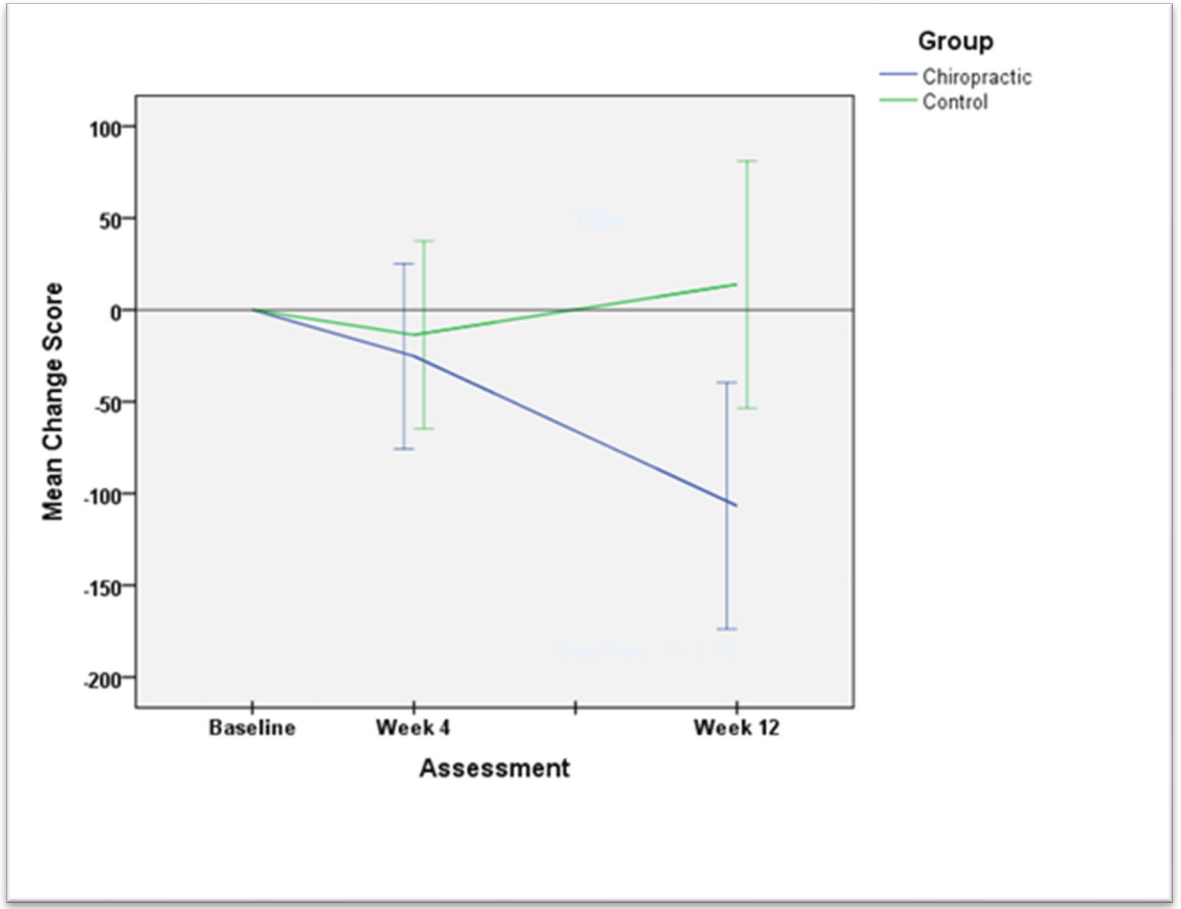




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Improved stepping times





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Latest Chiropractic Brain Clinical Trial in the UK





https://www.youtube.com/@heidi-haavik

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HAAVIK RESEARCH

Bruce Lipton & Heidi Haavik



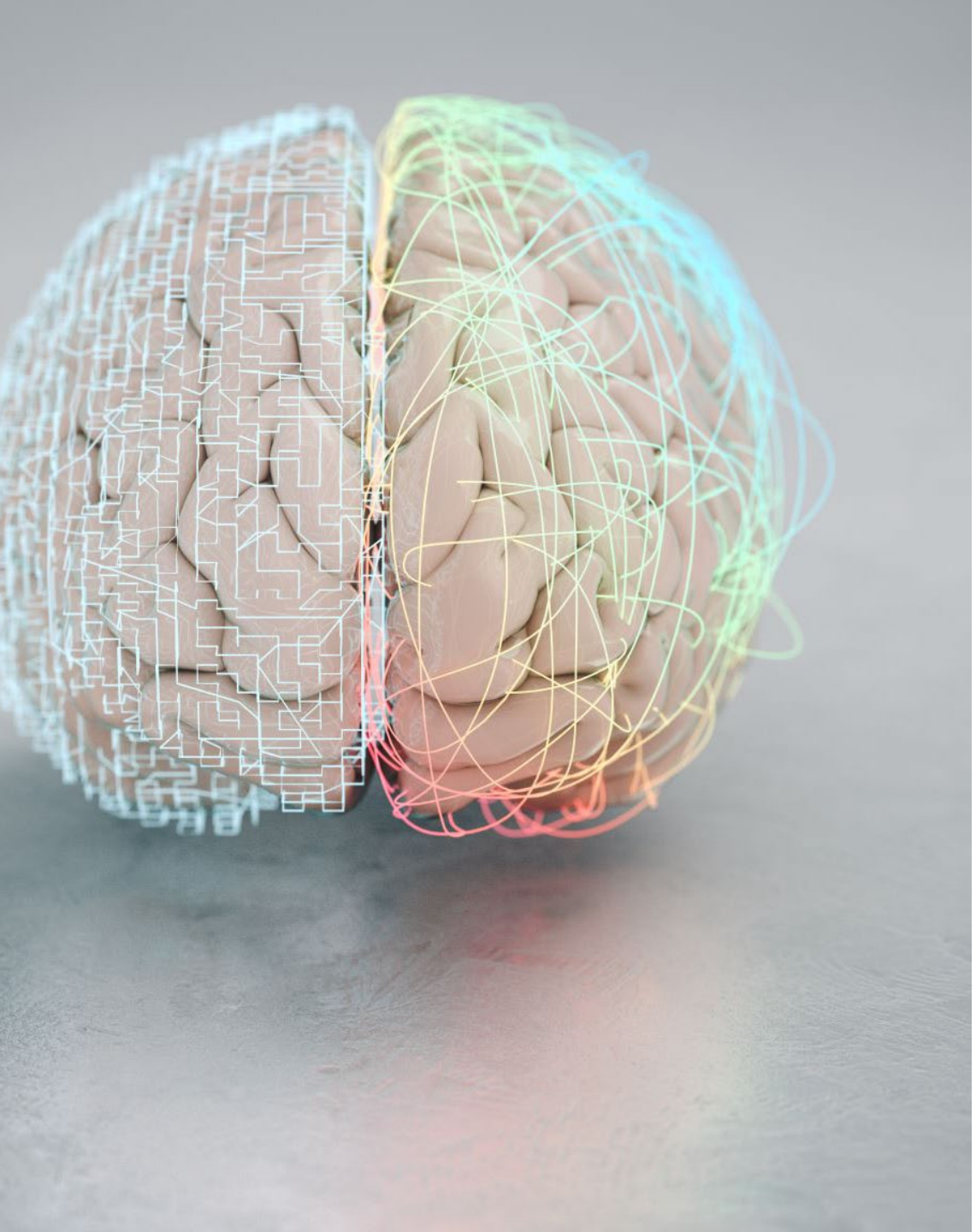


https://www.youtube.com/@heidi-haavik

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The Short Version

"Research indicates that chiropractic care enhances brain-body communication, allowing your brain to more accurately interpret internal and external signals. This improved perception of what is happening inside you and around you enables your brain to optimize bodily functions and adapt more effectively to your environment."

Heidi Haavik

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Do you now think it would be a good idea to get yourself a brain model for your practice?



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Do you own your science?

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ARE YOU A CONFIDANT COMMUNICATOR?



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Confidence and Clarity

Being able to confidently and clearly articulating a value proposition of chiropractic care impacts:

- Customer engagements
- New patients signing up
- Increased credibility and trust
- Accelerates business growth
- Improved competitive differentiation

Equals a major difference to the success of a small (or big) private practice



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All the resources for your patients and the public!

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Over 70 online classes about the science of chiropractic for you!

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Online classes for your chiropractic assistants!



Basic Science

LEVEL 1

For junior chiropractic students or chiropractic assistants who have not yet gained any in-depth knowledge about anatomy, physiology, or pathology.

Learn the facts about why good spinal function is so important, what happens when we adjust the spine, the detrimental impacts of stress and trauma, the important role of brain mal-adaptations in chronic pain, and how chiropractic care can improve strength and alter the prefrontal cortex and cerebellum function.



8 Lessons

BS1.01 The Many Models of the...

64 Minutes - An introduction into chiropractic neuroscience and the...

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



9 Lessons

BS1.02 The Brain Model of the...

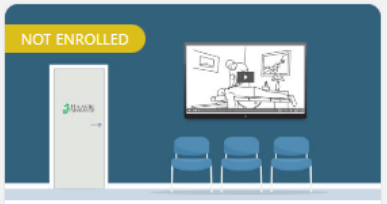
76 Minutes - How a healthy and a dysfunctional spine communicates...

Dr Heidi Haavik

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See more...

$24.00



11 Lessons

BS1.03 Your first visit to a Chiropractor

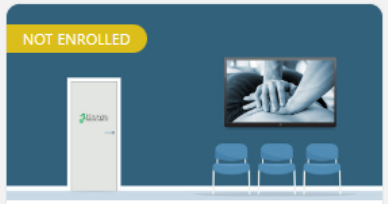
45 Minutes - What to expect from your first visit and "what is that...

Dr Jenna Duehr

0% Complete
0/0 Steps

See more...

$24.00



11 Lessons

BS1.04 Your first adjustment

42 Minutes - What is an adjustment, how does it work and what to expect.

Dr Jenna Duehr

0% Complete
0/0 Steps

See more...

$24.00



13 Lessons

BS1.08 Adjustments Improve Strength

46 Minutes - The effect of chiropractic on muscle strength and the latest...

Dr Jenna Duehr

0% Complete
0/0 Steps

See more...

$24.00



11 Lessons

BS1.09 The Prefrontal Cortex and...

66 Minutes - Chiropractic studies have shown adjustments can change...

Dr Alice Cade

0% Complete
0/0 Steps

See more...

$24.00



Neuroscience

LEVEL 1

Major advances in neuroscience knowledge have come about over the past several decades, so maintaining an up-to-date knowledge base is essential.

Study the origins of the nervous system, its structure and function, neurological disease, and cutting-edge approaches to improve outcomes from treatment.



7 Lessons

NS1.01 Neurobiology of the Neuron

56 Minutes - The basics of one of the two main cell types found in the nervous system.

Dr Heidi Haavik

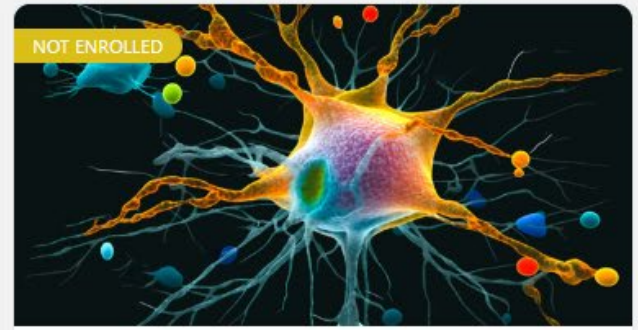


6 Lessons

NS1.02 Neurobiology of the Glial Cells

93 minutes - Be able to discuss the anatomy and function of the most common glial cells.

Dr Heidi Haavik



6 Lessons

NS1.03 The Nerve Cell Membrane

48 minutes - this class details how the brain functions and the mechanisms behind nerve impulses.

Dr Heidi Haavik

Chiropractic & Pregnancy



How often should you visit a Chiropractor?



Chiropractic Care and Breastfeeding



Chiropractic Care & Reaction Times



Effects of an Adjustment



Did you know that Chiropractors adj
segments in your spine called su

Recent scientific studies are revealing a new unders
chiropractic spinal adjustments work. We know much mo
and the rest of the central nervous system f



What is a subluxation?

Originally, many people thought that dysfunctional 'su
were 'out of place', or misaligned, and that this put press
the spine. We now know that a vertebral subluxation is no
of a bone being out of place; it is more that a bone is fun
less than ideal way – in a manner that is not 'normal'

Chiropractic Care and Golf



Infantile Colic



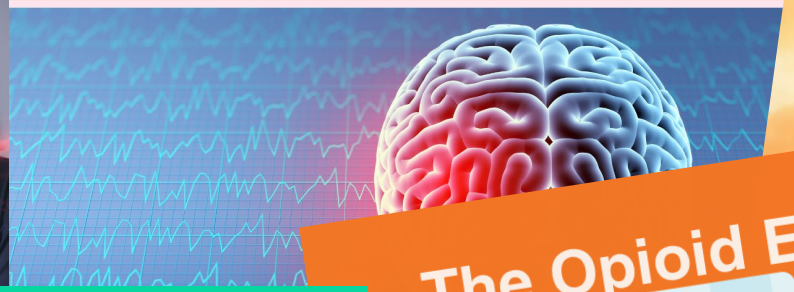
Healthy Ageing



Neck Pain



Pain is Created in the Brain



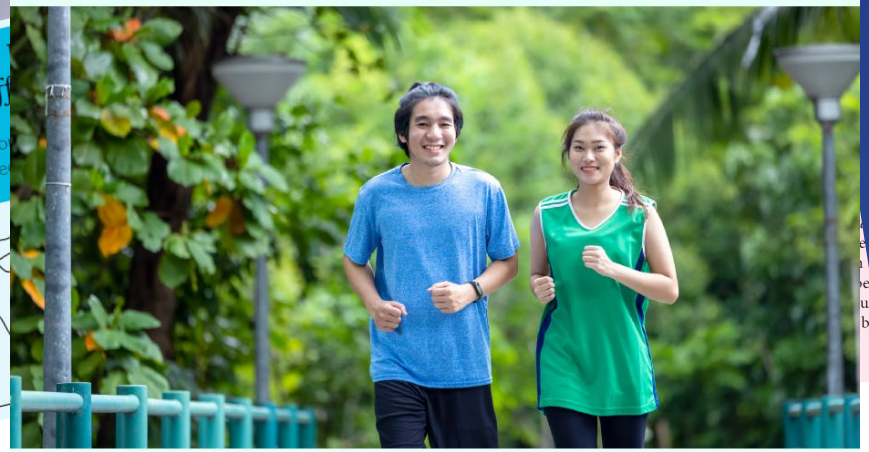
Understanding Pain



Lower Back Pain



Keep your Spine Moving



Did you know that even the ancient Greeks knew that movement and physical exercise was good for your brain?

Modern scientists have shown that movement is one of the keys to promoting a healthy brain.[1] Movement has been shown to help people with dementia, depression, and ADHD.[2]



Why is spinal movement important?

Scientists now know that it's not just physical exercise that's important for your brain, but how your spine moves is also very important for keeping your brain healthy. It's even been shown to change the structure of your brain and improve your concentration and how fast you can think and react.[1,5,6]

The Opioid Epidemic



We've all heard about the opioid epid
are opioids and why are they such

Opioids are basically a type of pain killing dr
Why wouldn't you want to take dr



Do you think Heroi

In case you're unsure how
side effects from taking h
abscesses, constipation, liver,
with sexual function, and death.
people every single year and it is a high

1

Maintenance Care



Did you know that 50% of patients visit a chiropractor simply to maintain their health and well-being!

Lato - Light Aenean ac tincidunt lectus, eu facilisis leo. Donec sodales libero sit amet lacus ornare feugiat. Nulla gravida a lectus vitae efficitur.



What is maintenance care?

Maintenance care is when patients go to a chiropractor even when they are not
pain or discomfort. The idea with maintenance care is that regular adjustm
help maintain your spine and nervous system function at its optima
you to be your best and to prevent new episodes of pain deve

1

debilitating

t know what's causing
ing like a fracture or an
moving and functioning,
on in your back.[4-7]

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50+ videos to use on your website

Select videos in 9 different languages (Danish, Dutch, French, German, Italian, Icelandic, Norwegian and Swedish)

2 x waiting room videos (English only)

Content for blogs and newsletters

Health Talks and handouts

Social Media video snippets

Referenced Research Summaries

Print and Digital Resources

Gold

1. Enlighten Patients
2. Learn the Science

Everything in Silver Plus:

3 x waiting room videos (English only)

Full access to ChirosAcademy.com

Over 90 Basic Science, Clinical Science, Research Methods, Statistics, Philosphy and Neuroscience Classes

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Class Certificates on completion

Platinum

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