The Triple Brain Model



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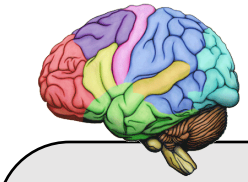
HAAVIK RESEARCH

The Contemporary Model of the Subluxation

Interoceptive input:
- Pain
- Temperature
- Chemoreception
- Emotions
- Proprioception

Exteroceptive input:
- Vision
- Olfaction
- Audition
- Gustation

Past experiences and expectations about the future



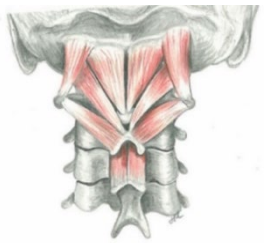
Spinal adjustment

Altered vertebral column afferent input

Abnormal multisensory processing and filtering of exteroceptive and interoceptive stimuli and abnormal sensorimotor integration

Impacting:
- Whole body proprioception
- Whole body motor control
- Whole body control, homeostasis, neuro- and bio-plasticity
- Resilience, adaptability, function, wellbeing

Vertebral subluxation



Altered vertebral column function

Altered vertebral column motor control

Haavik et al 2021 EJAP

The contemporary model of the Subluxation and Effects of Adjustment



European Journal of Applied Physiology
https://doi.org/10.1007/s00421-021-04727-z

INVITED REVIEW

The contemporary model of vertebral column joint dysfunction and impact of high-velocity, low-amplitude controlled vertebral thrusts on neuromuscular function

Heidi Haavik[1] · Nitika Kumari[1,2] · Kelly Holt[1] · Imran Khan Niazi[1,2,3] · Imran Amjad[1,4] · Amit N. Pujari[5,6] · Kemal Sitki Türker[7,8] · Bernadette Murphy[9]

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Abstract

Purpose There is growing evidence that vertebral column function and dysfunction play a vital role in neuromuscular control. This invited review summarises the evidence about how vertebral column dysfunction, known as a central segmental motor control (CSMC) problem, alters neuromuscular function and how spinal adjustments (high-velocity, low-amplitude or HVLA thrusts directed at a CSMC problem) and spinal manipulation (HVLA thrusts directed at segments of the vertebral column that may not have clinical indicators of a CSMC problem) alters neuromuscular function.

Methods The current review elucidates the peripheral mechanisms by which CSMC problems, the spinal adjustment or spinal manipulation alter the afferent input from the paravertebral tissues. It summarises the contemporary model that provides a biologically plausible explanation for CSMC problems, the manipulable spinal lesion. This review also summarises the contemporary, biologically plausible understanding about how spinal adjustments enable more efficient production of muscular force. The evidence showing how spinal dysfunction, spinal manipulation and spinal adjustments alter central multimodal integration and motor control centres will be covered in a second invited review.

Results Many studies have shown spinal adjustments increase voluntary force and prevent fatigue, which mainly occurs due to altered supraspinal excitability and multimodal integration. The literature suggests physical injury, pain, inflammation, and acute or chronic physiological or psychological stress can alter the vertebral column's central neural motor control, leading to a CSMC problem. The many gaps in the literature have been identified, along with suggestions for future studies.

Conclusion Spinal adjustments of CSMC problems impact motor control in a variety of ways. These include increasing muscle force and preventing fatigue. These changes in neuromuscular function most likely occur due to changes in supraspinal excitability. The current contemporary model of the CSMC problem, and our understanding of the mechanisms of spinal adjustments, provide a biologically plausible explanation for how the vertebral column's central neural motor control can dysfunction, can lead to a self-perpetuating central segmental motor control problem, and how HVLA spinal adjustments can improve neuromuscular function.

Keywords Chiropractic · Spinal manipulation · Muscle strength · Neuromuscular function

Abbreviations

AMCT	Activator methods chiropractic technique
ASMT	Activator-assisted spinal manipulative therapy
APB	Abductor pollicis brevis
CSMC	Central segmental motor control
CNS	Central nervous system
CSP	Cortical silent period
EIP	Extensor indicis proprius
EMG	Electromyography
EBP	Early bereitschaftpotential
FFA	Feed-forward activation
GTO	Golgi tendon organ
HD	High density
HVLA	High-velocity, low-amplitude
IVF	Intervertebral foramina
LBP	Late bereitschaftpotential

Communicated by Michael Lindinger .

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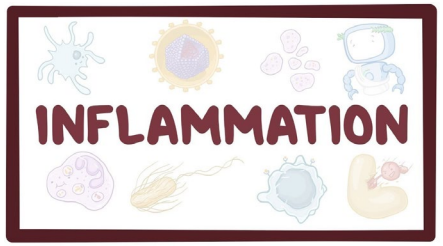
Extended author information available on the last page of the article

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Heidi Haavik, Nitika Kumari, Kelly Holt, Imran Khan Niazi, Imran Amjad, Amit N. Pujari, Kemal Sitki Türker, Bernadette Murphy. (2021a) The contemporary model of vertebral column joint dysfunction and impact of high-velocity, low-amplitude controlled vertebral thrusts on neuromuscular function. Invited Review. European Journal of Applied Physiology. https://doi.org/10.1007/s00421-021-04727-z

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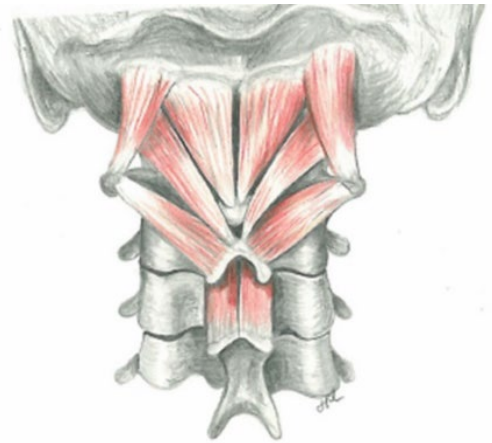


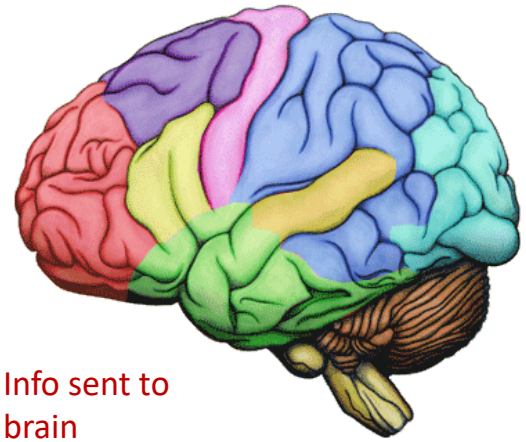
Stress



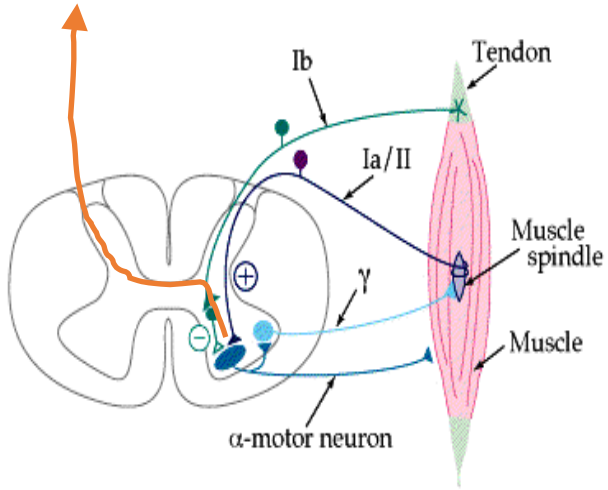
Injury

Small muscles closest to spine and skull go to sleep



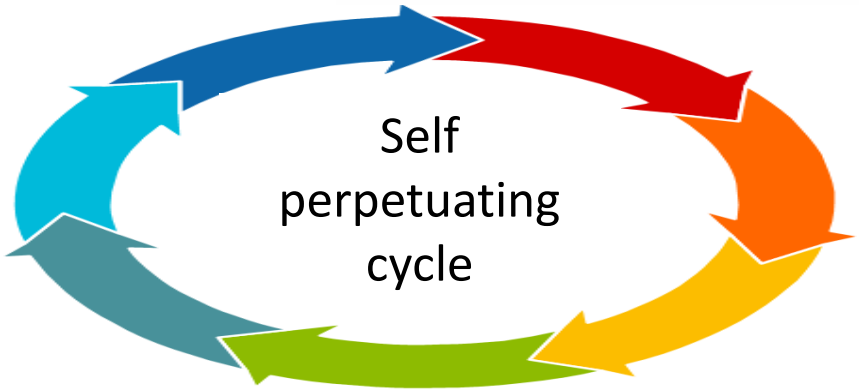


Info sent to brain



Altered messages going to brain from spine

Poor body awareness
Poor body control
Poor function



So brain does NOT know accurately what is going on



Changes brains internal representations about what is going on inside and outside body

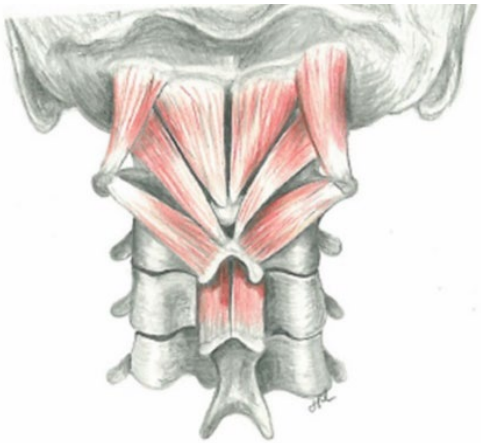
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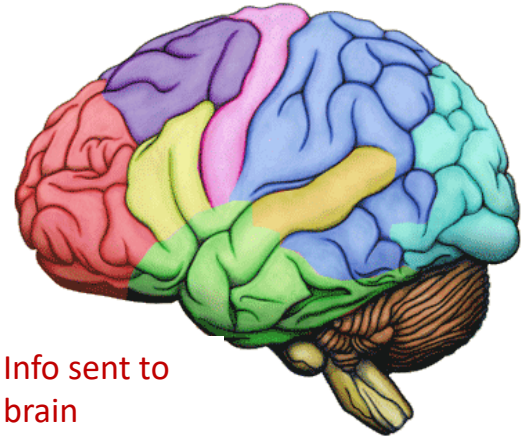
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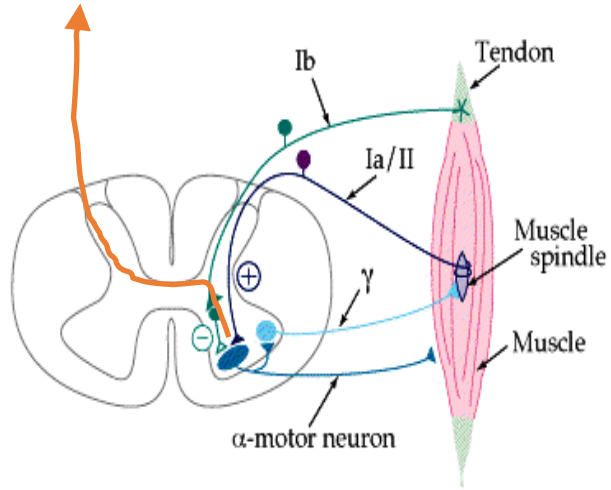
Adjustment

Stretches small muscles closest to spine and scull



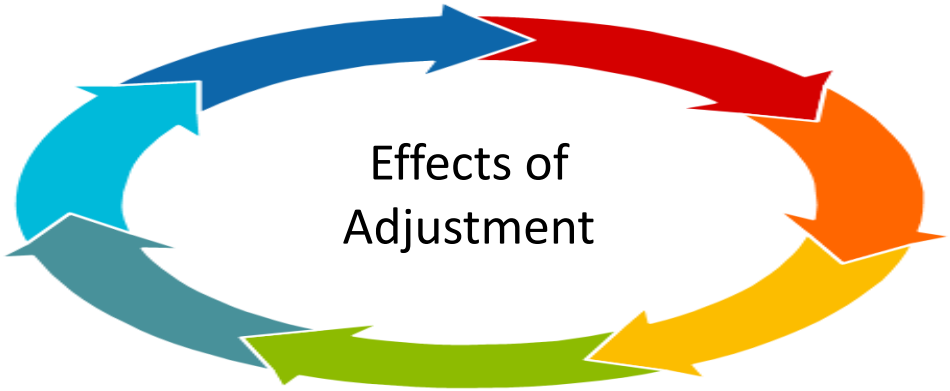


Info sent to brain



Bombards brain with mechanoreceptor input

Improved body awareness
Improved body control
Improved function

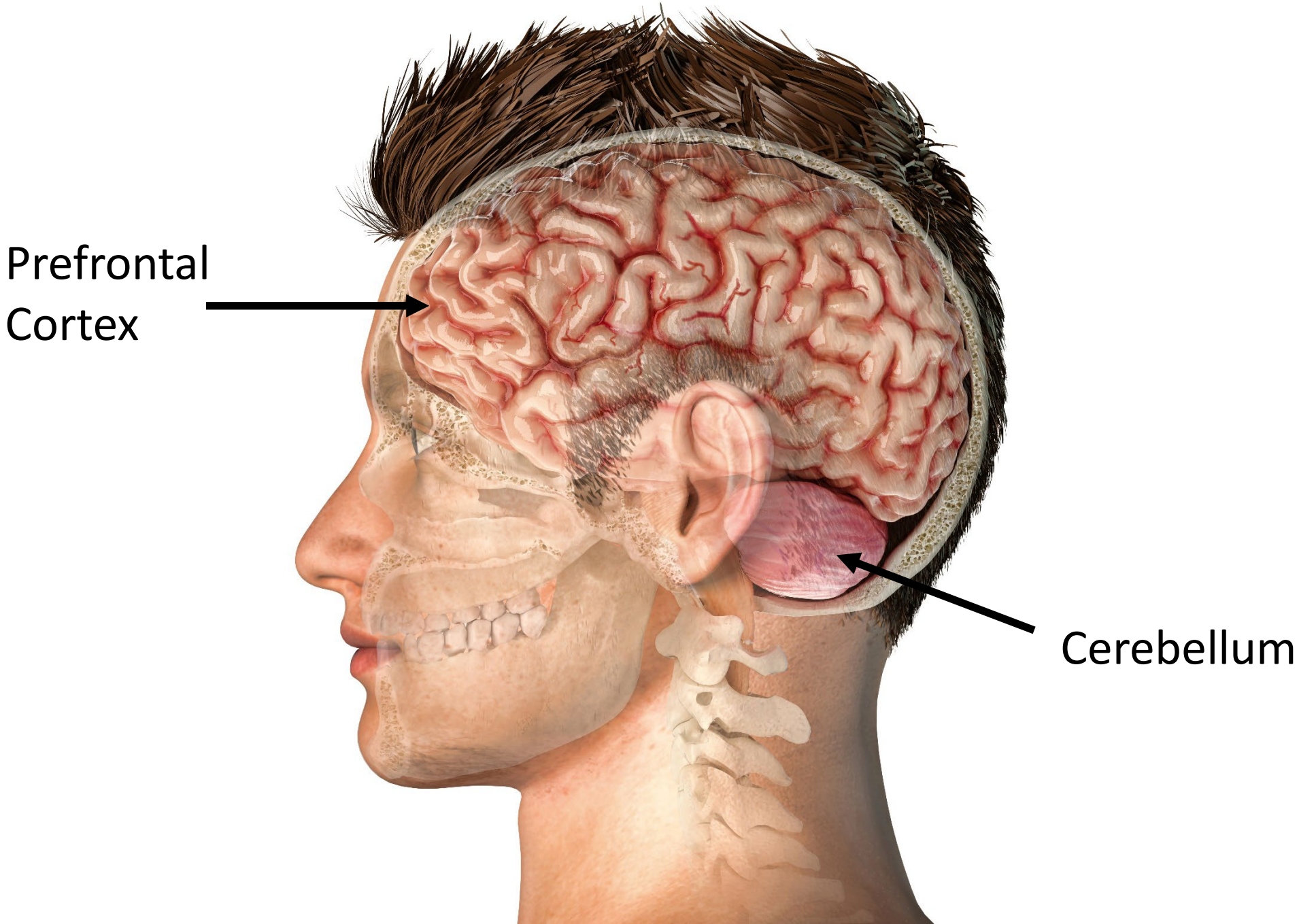


So brain knows MORE accurately what is going on



Changes brains internal representations about what is going on inside and outside body

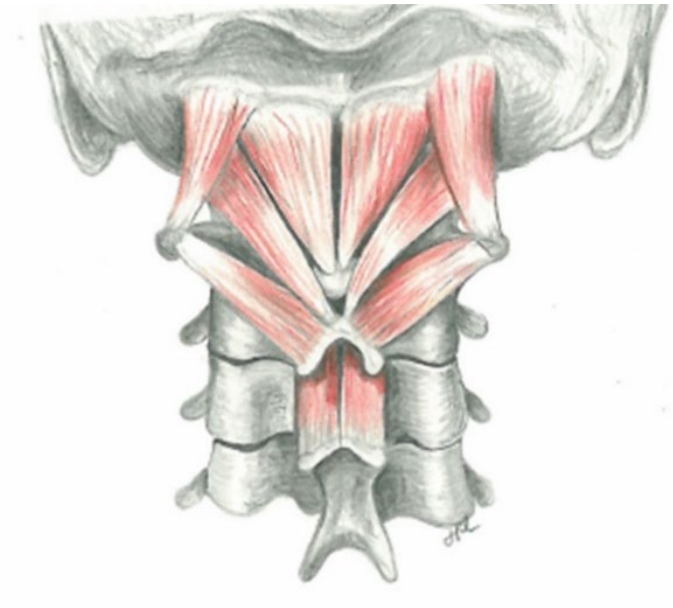
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Prefrontal
Cortex
Cerebellum

What happens when the spine dysfunctions?

Subluxated segment deep paraspinal muscles over time become:

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

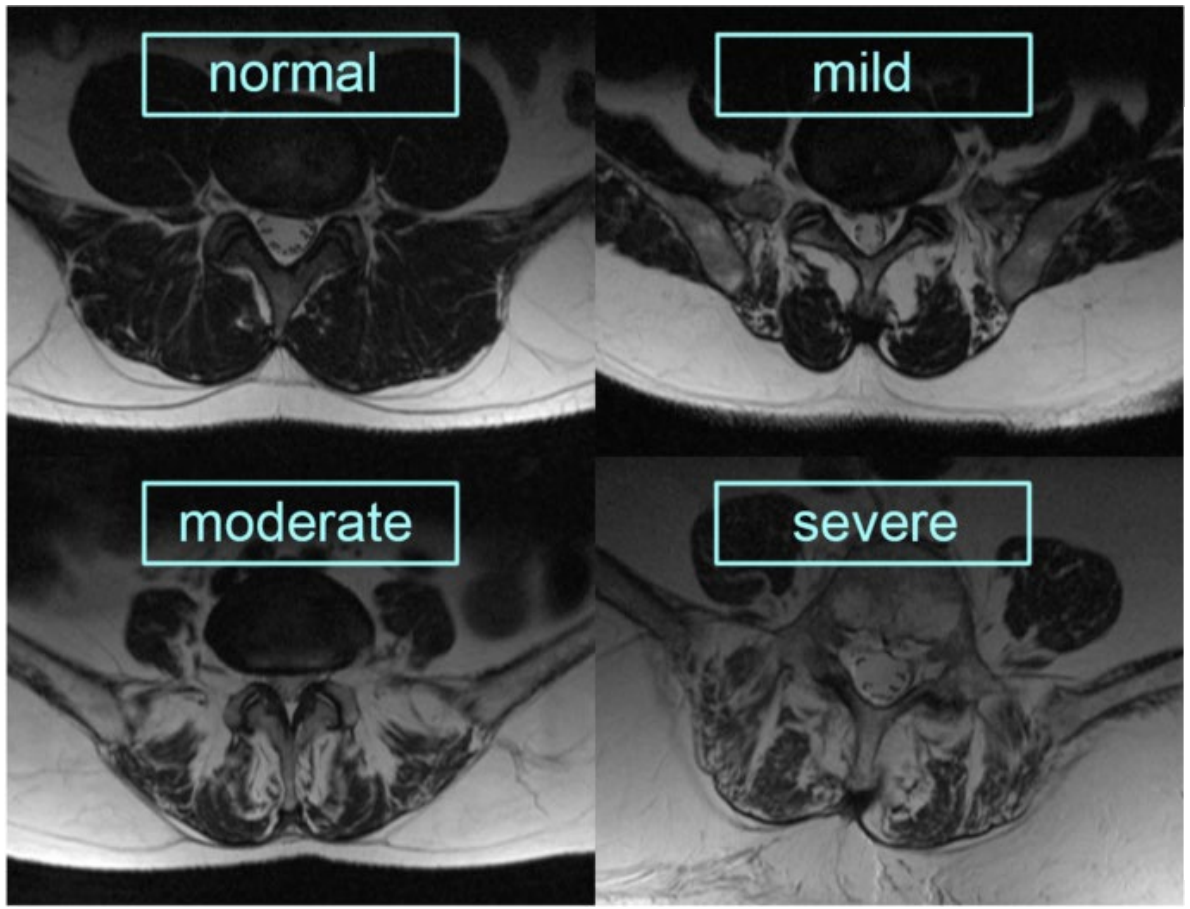


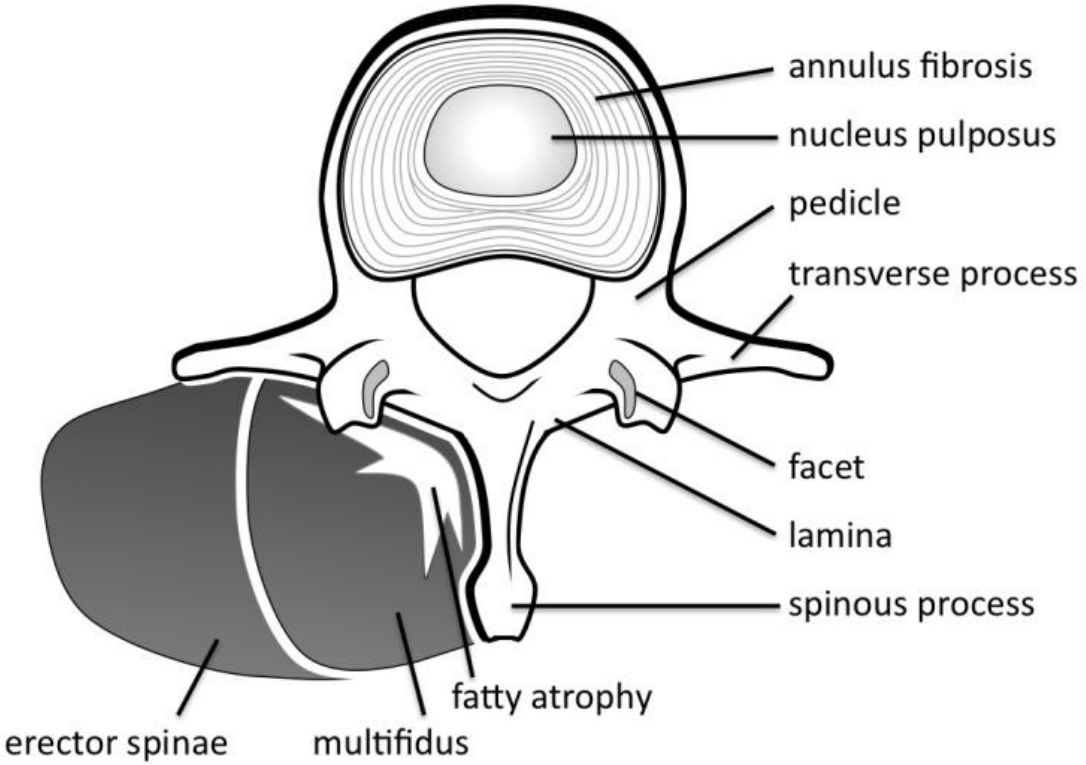
Deep paraspinal muscles around a ‘healthy’ segment are:

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

NOT Good

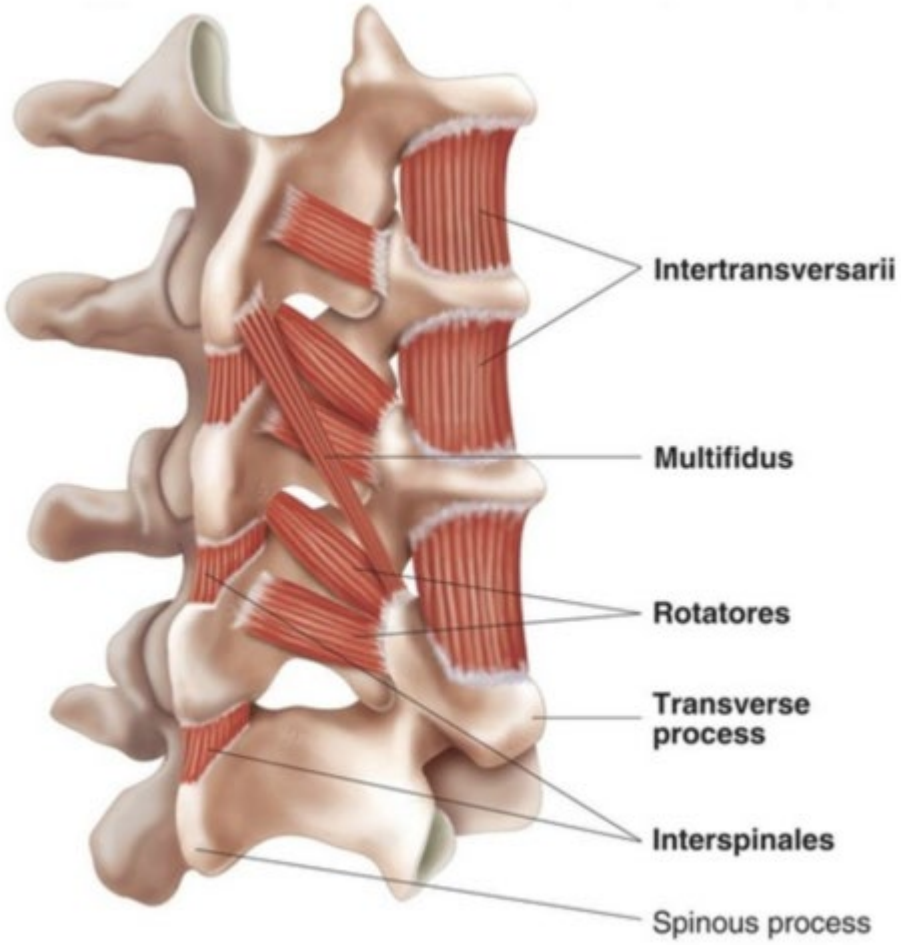
Good

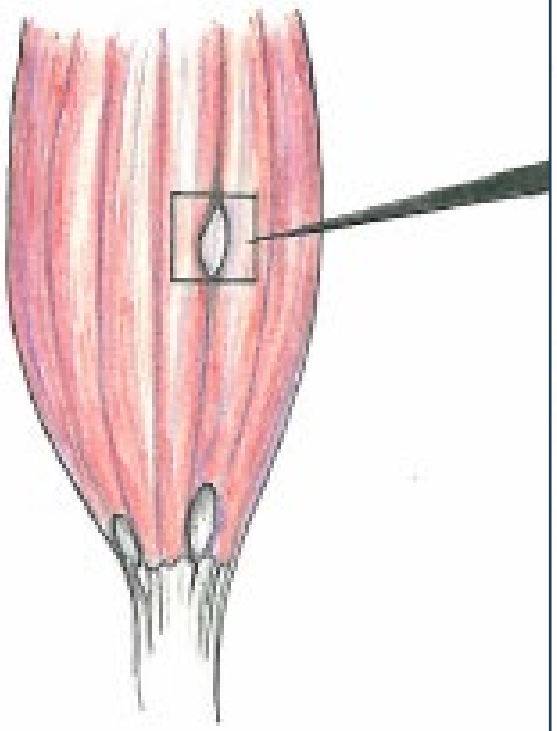


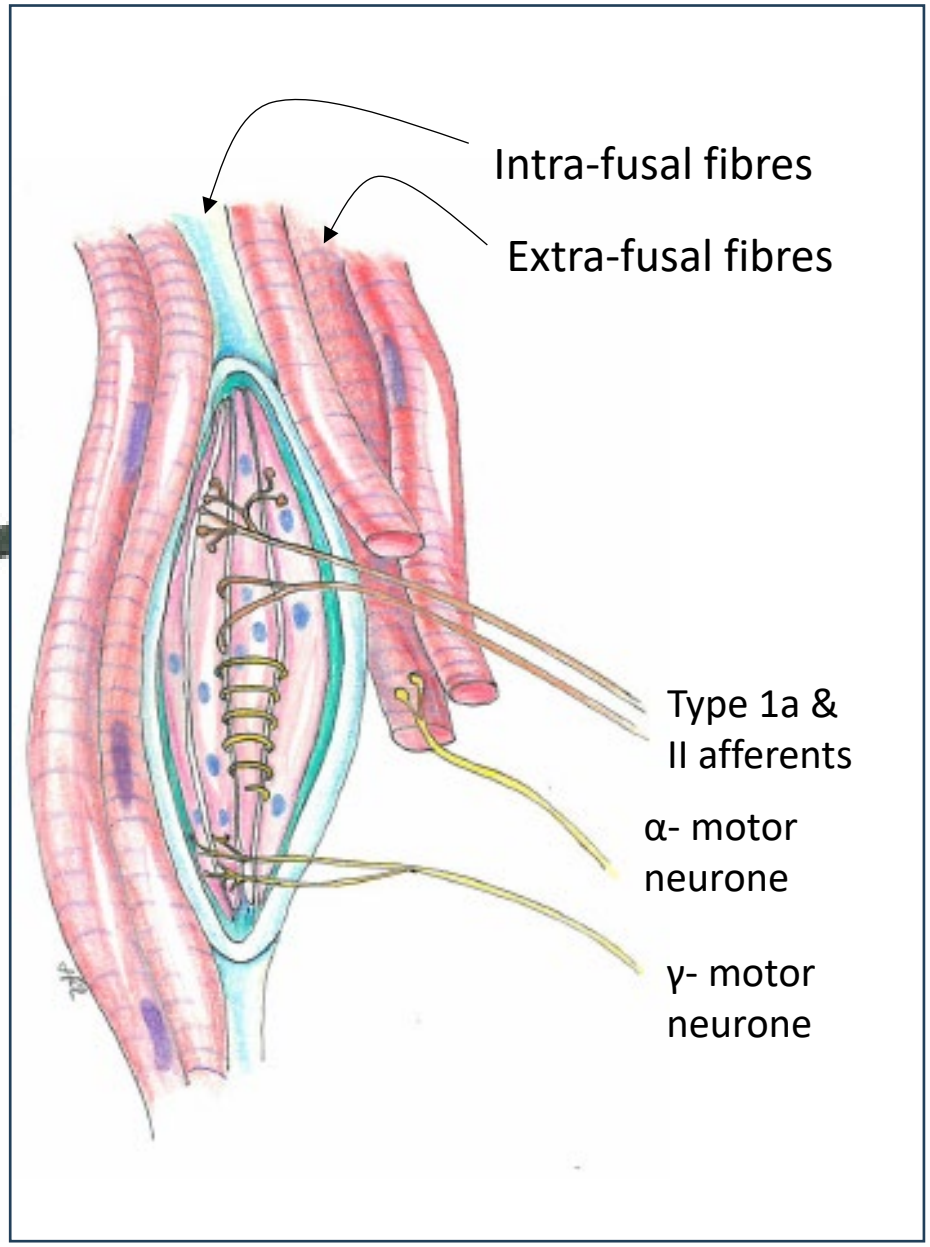


Faur, C., Patrascu, J.M., Haragus, H. and Anglitoiu, B., 2019. Correlation between multifidus fatty atrophy and lumbar disc degeneration in low back pain. BMC musculoskeletal disorders, 20(1), pp.1-6.

MUSCLE SPINDLES

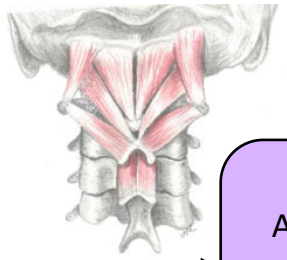






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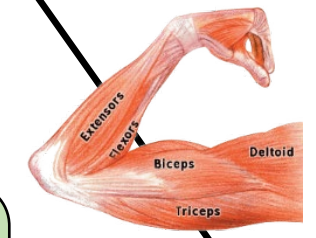




Altered paraspinal muscle proprioception

Predicted sensory feedback from intended movement

Integration of predicted vs actual sensory feedback



Movement intention

Movement plan

Motor command

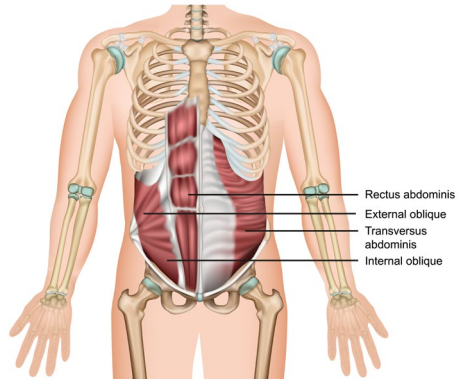
Movement coordination and execution centres

Muscles

Stress Fear Pain



Feedforward postural control of vertebral column



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

Touch

Smell

Vision

Taste

Sound

Past Experiences

The inner brain schema of the body and the world around you

Expectations about your future

Temperature

Chemoreception

Nociception

Emotions

Proprioception & Kinaesthesia

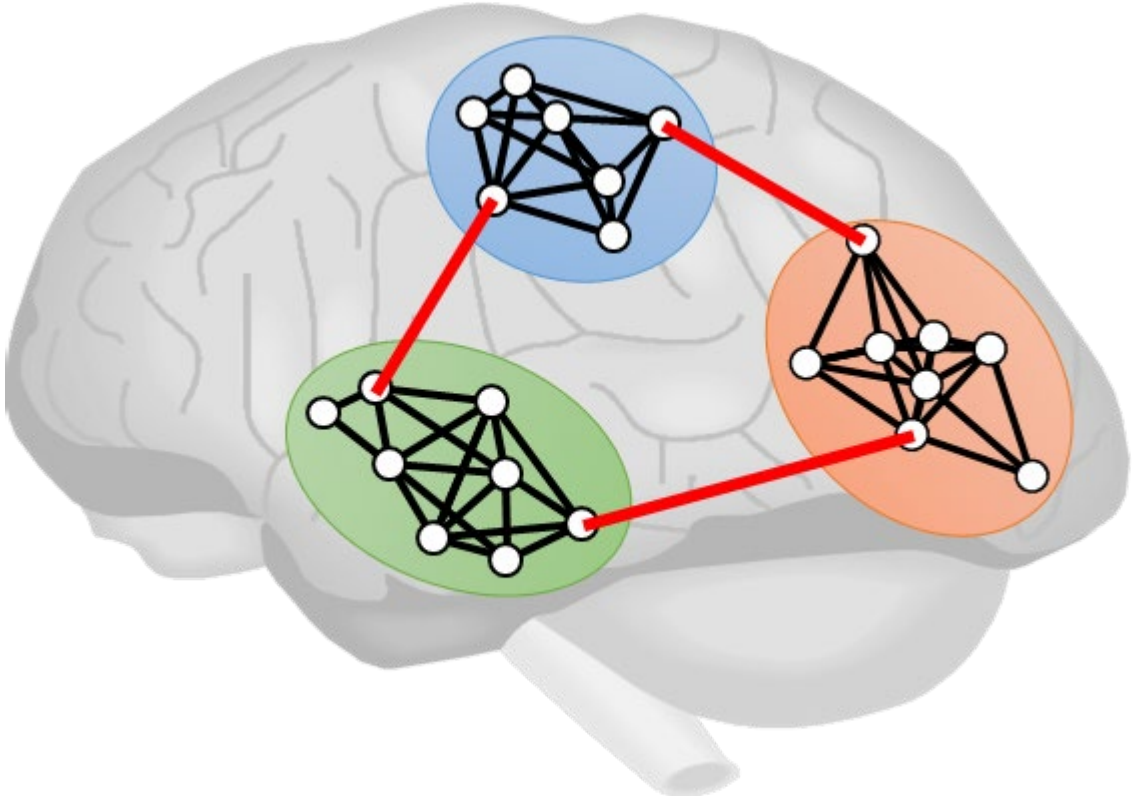
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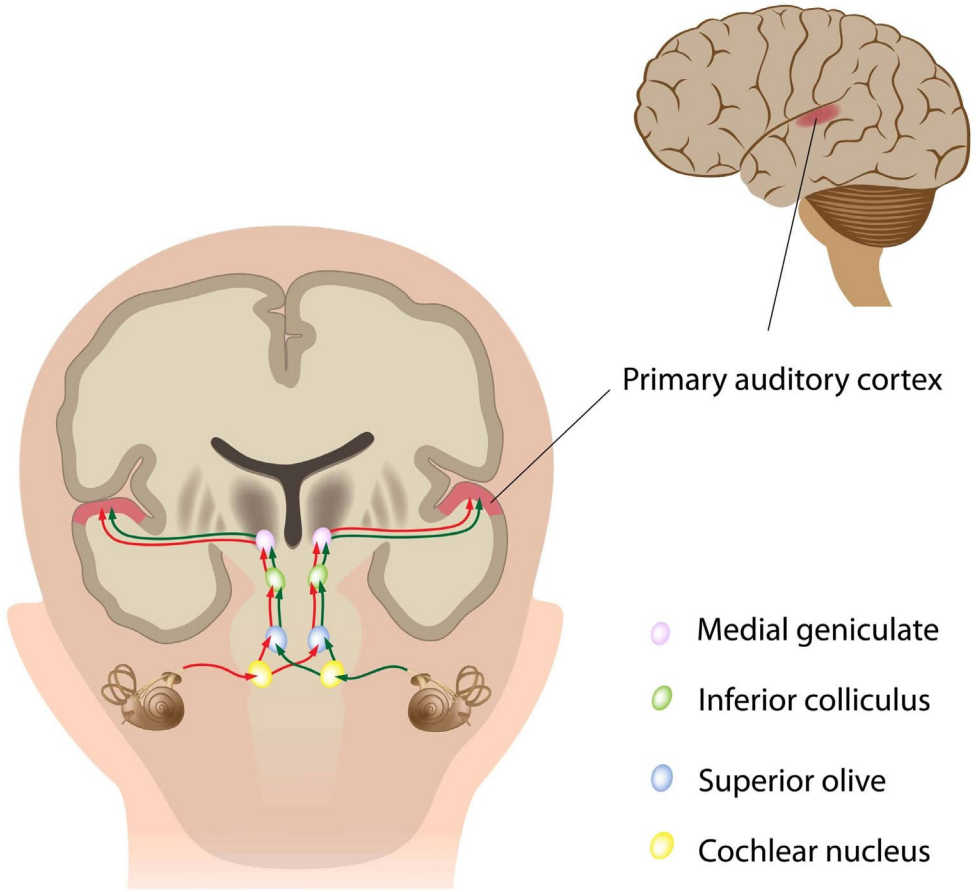
Biological Networks in the Brain (and Hubs)

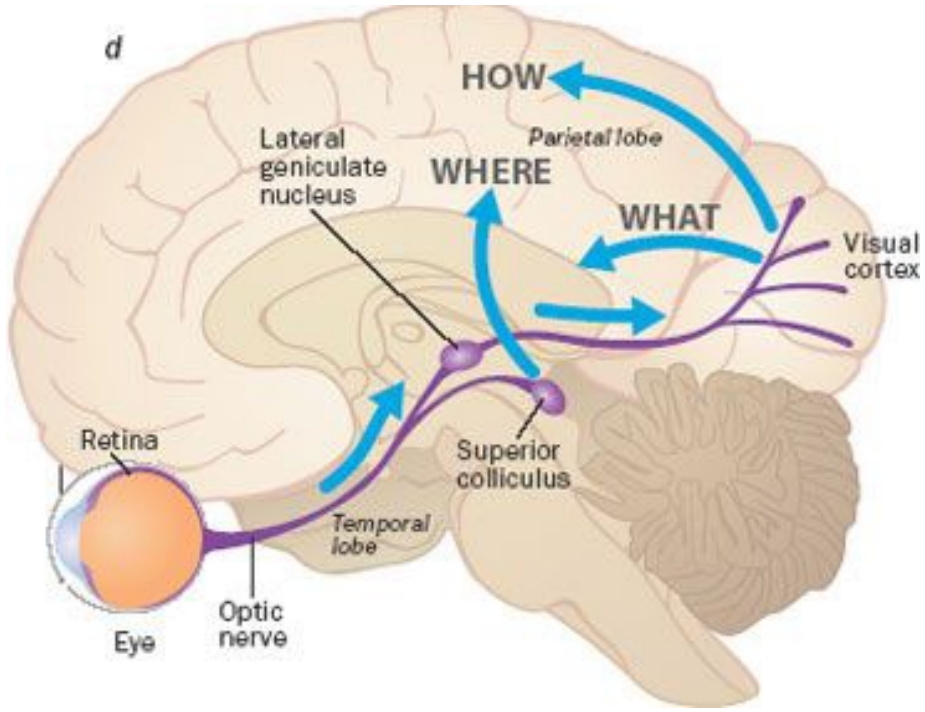
- A biological neural network in the brain is a complex network of neurons that are chemically connected by synapses.

- Neurons send and receive electrochemical signals to each other, and the brain uses these signals to process information.



Interpreting sound and visual information
What? Where? How?





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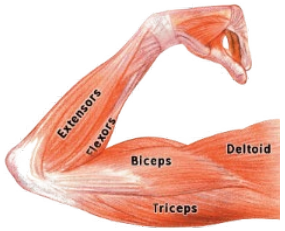
Sensory Modality



Somatosensory



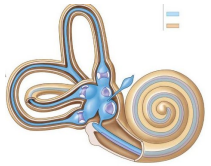
Vision



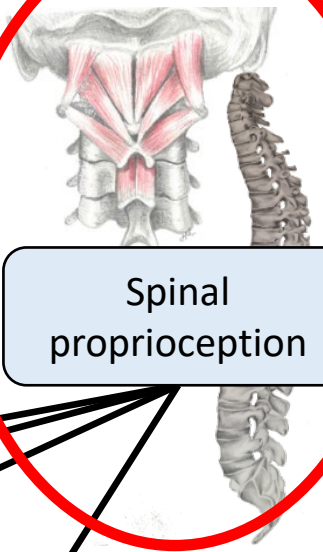
Body proprioception



Efference Copies



Vestibular



Spinal proprioception



Sound

Brain Maps HUBs

Body map

Postural map

Body in space map

Moving body map

Reason for Map NETWORK

Tactile localization on the body

Tactile localization in space

Sound localization

Spatial updating of body location

Haavik et al 2021 EJAP

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Triple Brain Network & Consciousness

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Outward facing!

Sensorimotor Networks

- Goal & task oriented
- Pay attention (& not judging)
- Focus on tasks
- Solve problems
- Make decisions

Salience Network

- Threat detection
- Monitors internal and external stimuli
- Directs attention towards most important (salient) stimuli in environment, body or thoughts

Sensory Networks

- Self-referential thinking
- Introspection beliefs
- Processing of emotions and memories
- Our story of self

Executive Network

Default Mode Network

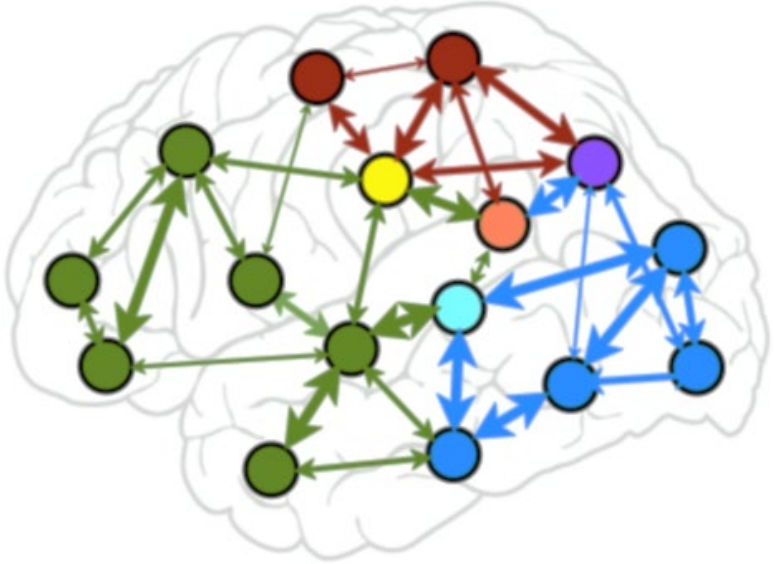
Inward facing!
Past, present & future

(De Ridder et al. 2022)

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Characterising brain network activity changes following chiropractic care using whole head electroencephalography (EEG)



















- As seen on Russell Brand show

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As seen on YouTube in Russell Brand Interview





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

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Bruce Lipton & Heidi Haavik





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

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Two Large RCTs also conducted in Pakistan!

- Two separate groups
  - Adults
  - Teenagers
- 12 weeks of chiro care
- 4 week follow up
- EEG + Lots of clinical outcomes related to PFC
  - Immune
  - Emotions
  - Sleep
  - executive functions
  - etc





Some Preliminary UK Study Results

New Zealand College of Chiropractic

Control Group

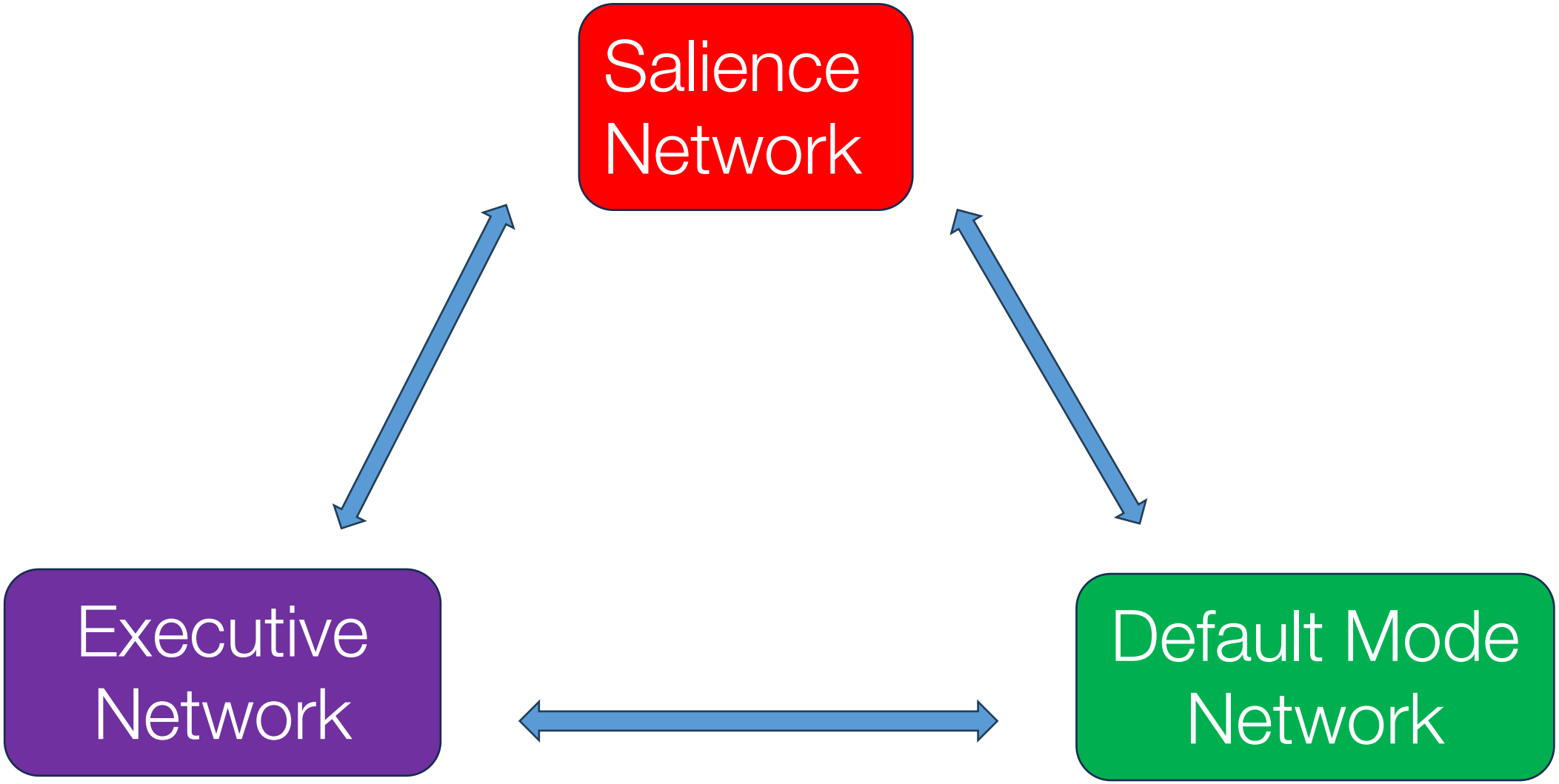
NO significant changes at all

Chiropractic Group

- Improved QOL overall
- Improved Physical function
- Less Depression
- Less anxiety
- Less Fatigue
- Less pain interference
- Less pain intensity



Triple Brain Network

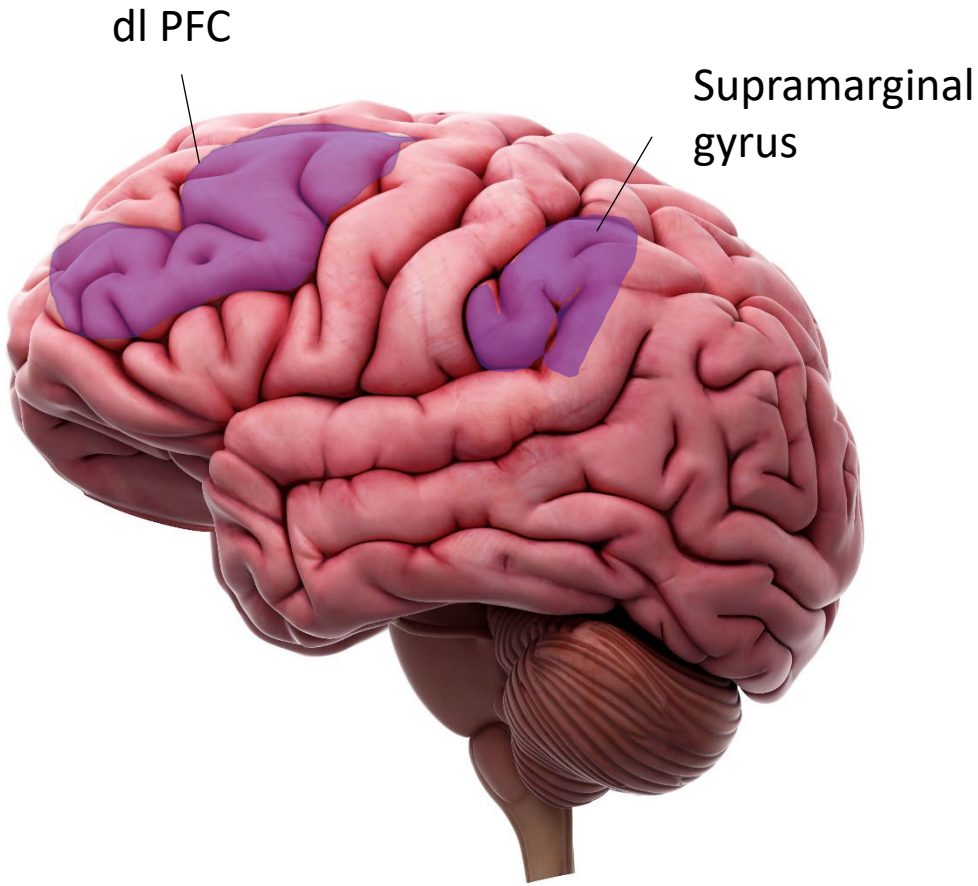


(De Ridder et al. 2022)

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Fronto-parietal (Executive Control) Network

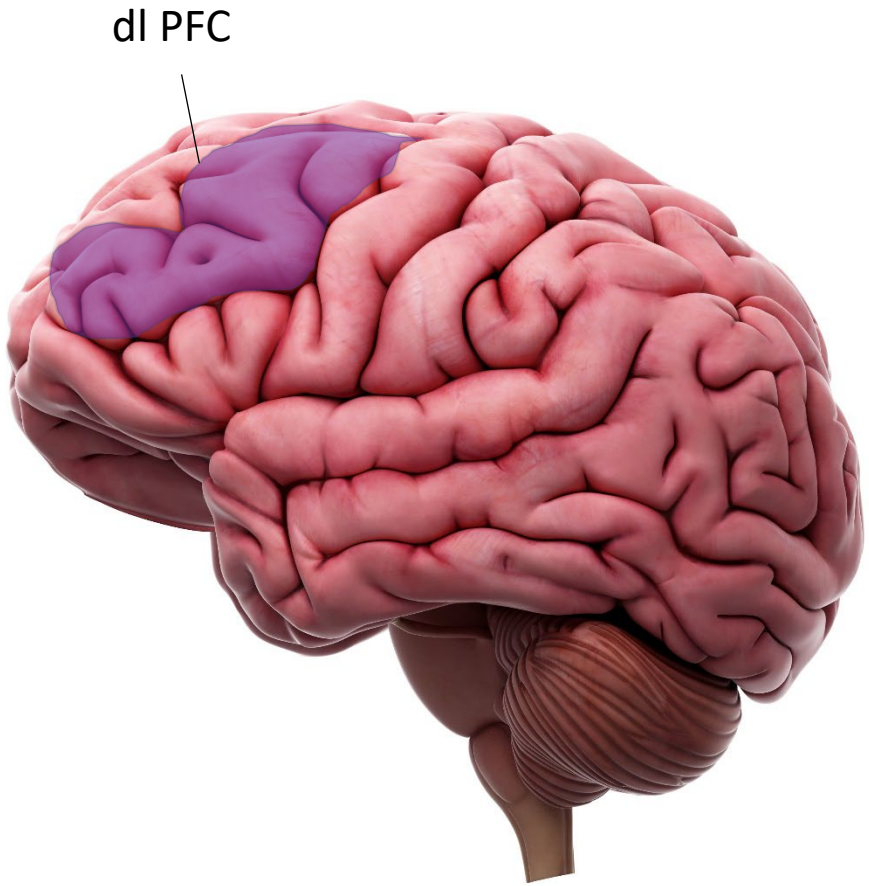
- It is Goal and Task oriented
- When you are actively engaged in a task
- Actively paying attention (and not judging)
- Capable of recruiting a wide variety of brain systems
- Multiple FP / EC networks
- Key Regions
  - Dorsolateral PFC
  - Posterior parietal cortex (supramarginal gyrus)



(Witt, van Ettinger-Veenstra et al. 2021; Menon and D'Esposito 2022; Menon and D'Esposito 2022)

Dorsolateral Prefrontal Cortex

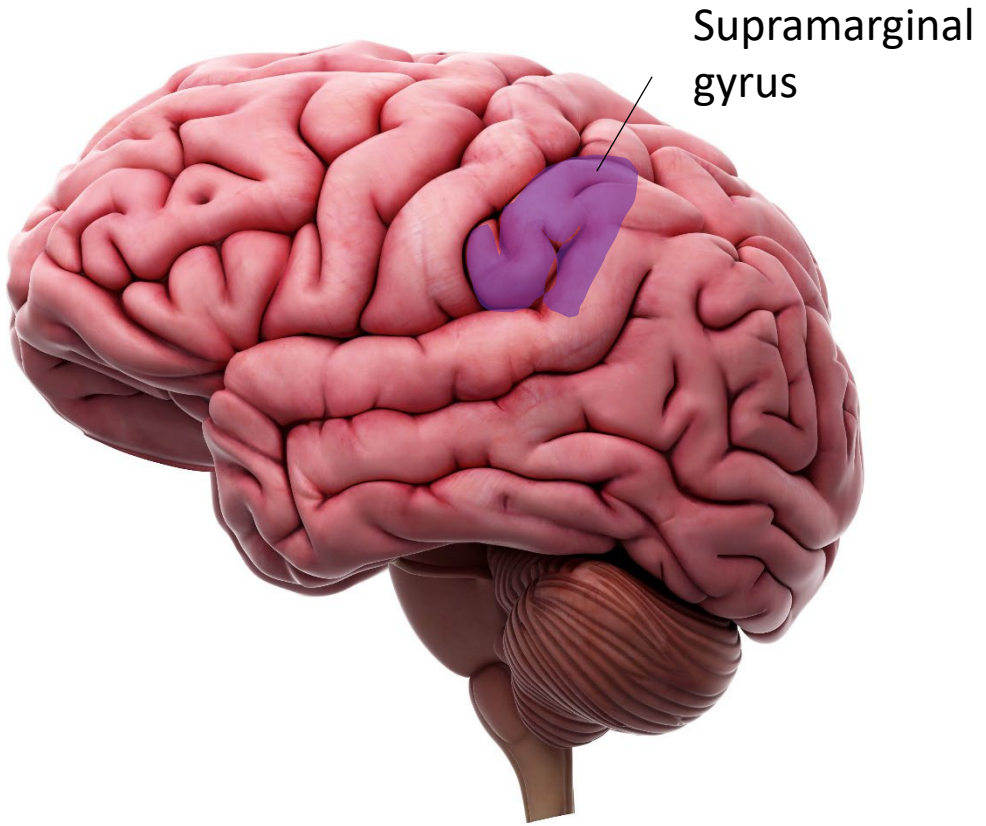
- Appraisal of emotional state and based on potential regulatory strategies based on context and goals
- Cognitive flexibility
- Attentional Control
- Decision Making
- Planning and organising
- Abstract thinking



(Witt, van Ettinger-Veenstra et al. 2021; Menon and D'Esposito 2022; Menon and D'Esposito 2022)

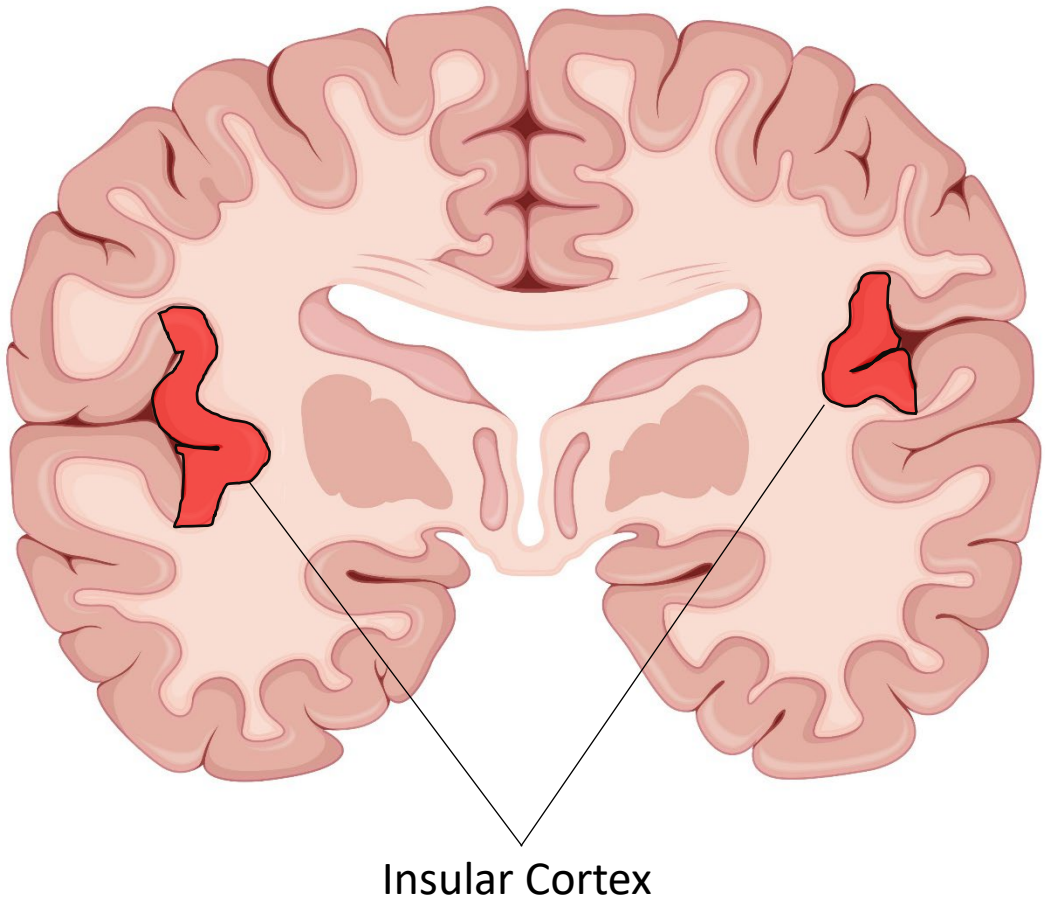
Posterior Parietal Cortex (Supramarginal gyrus)

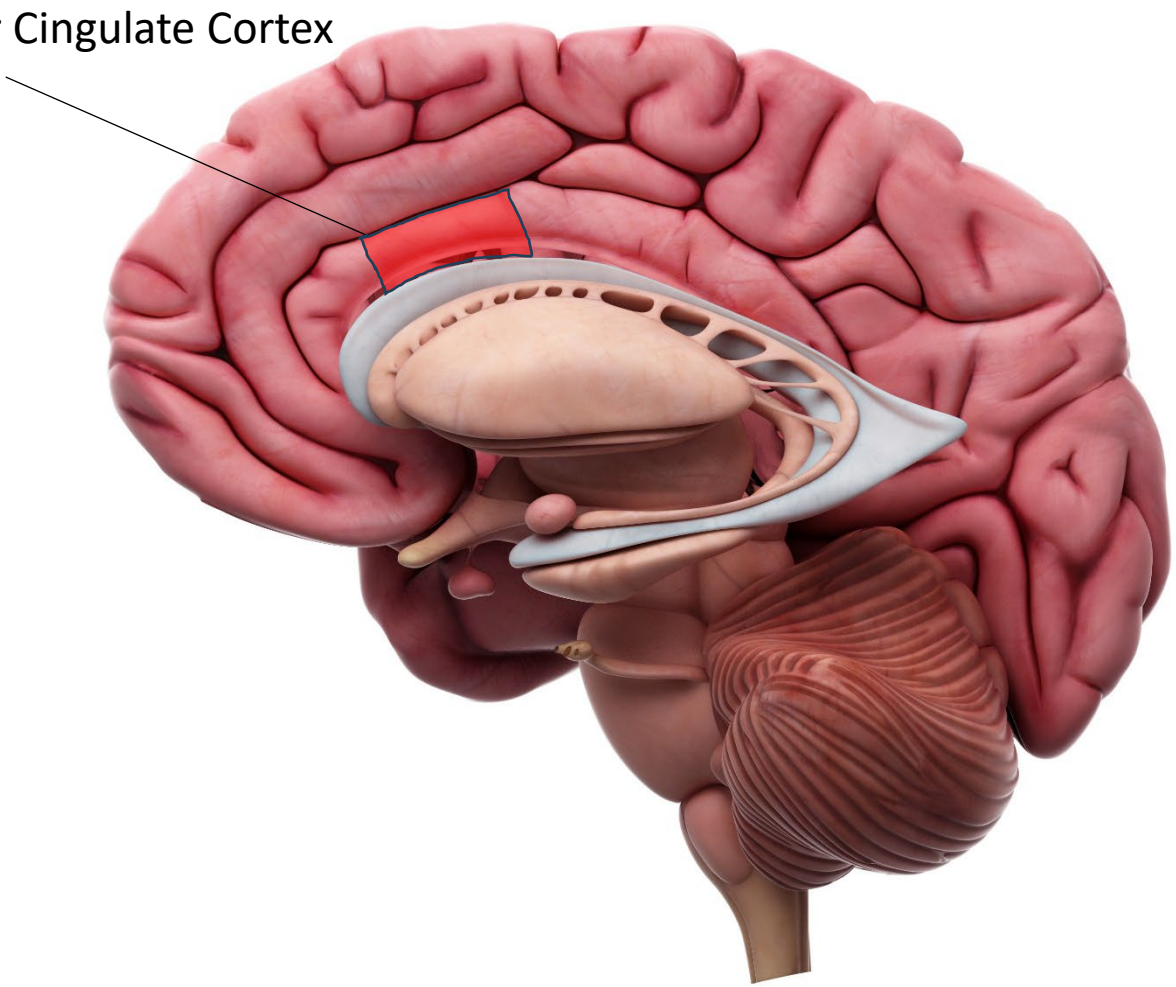
- Sensorimotor Integration and Body awareness
  - Toch, movement, proprioception
  - Help coordinate motor actions
- Social Cognition and Empathy
- Language Processing
- Reading and Dyslexia
- Mirror Neuron System (imitation and understanding actions of others)



(Witt, van Ettinger-Veenstra et al. 2021; Menon and D'Esposito 2022; Menon and D'Esposito 2022)

Salience Network

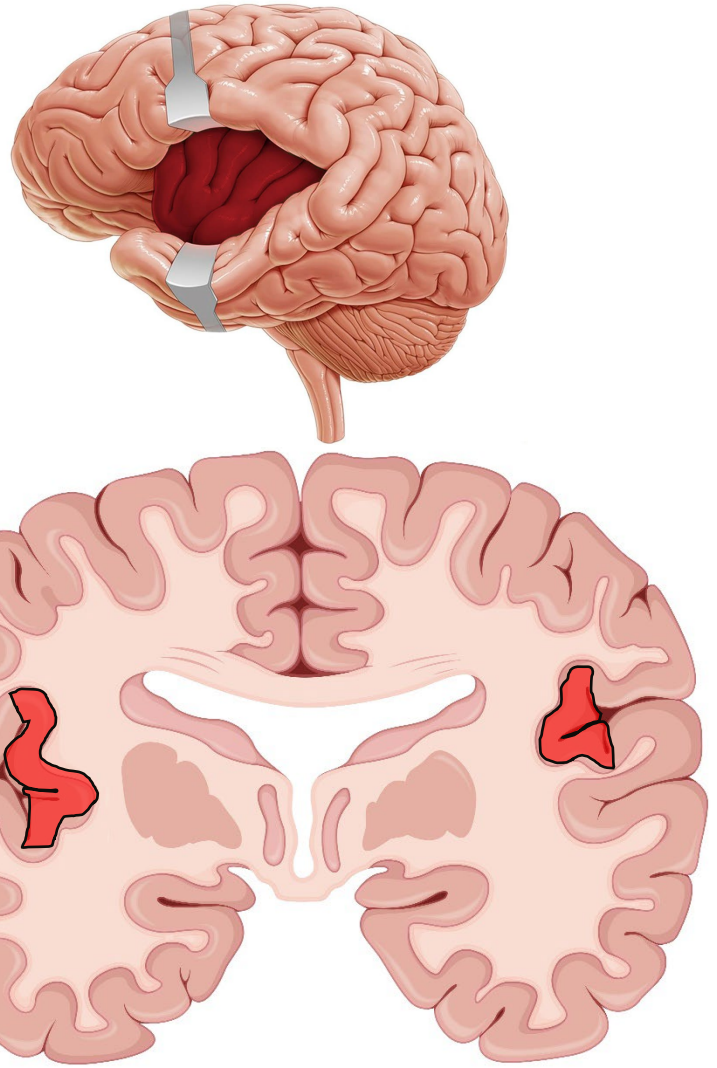




Core control network that guides all mental activity and behavior in humans

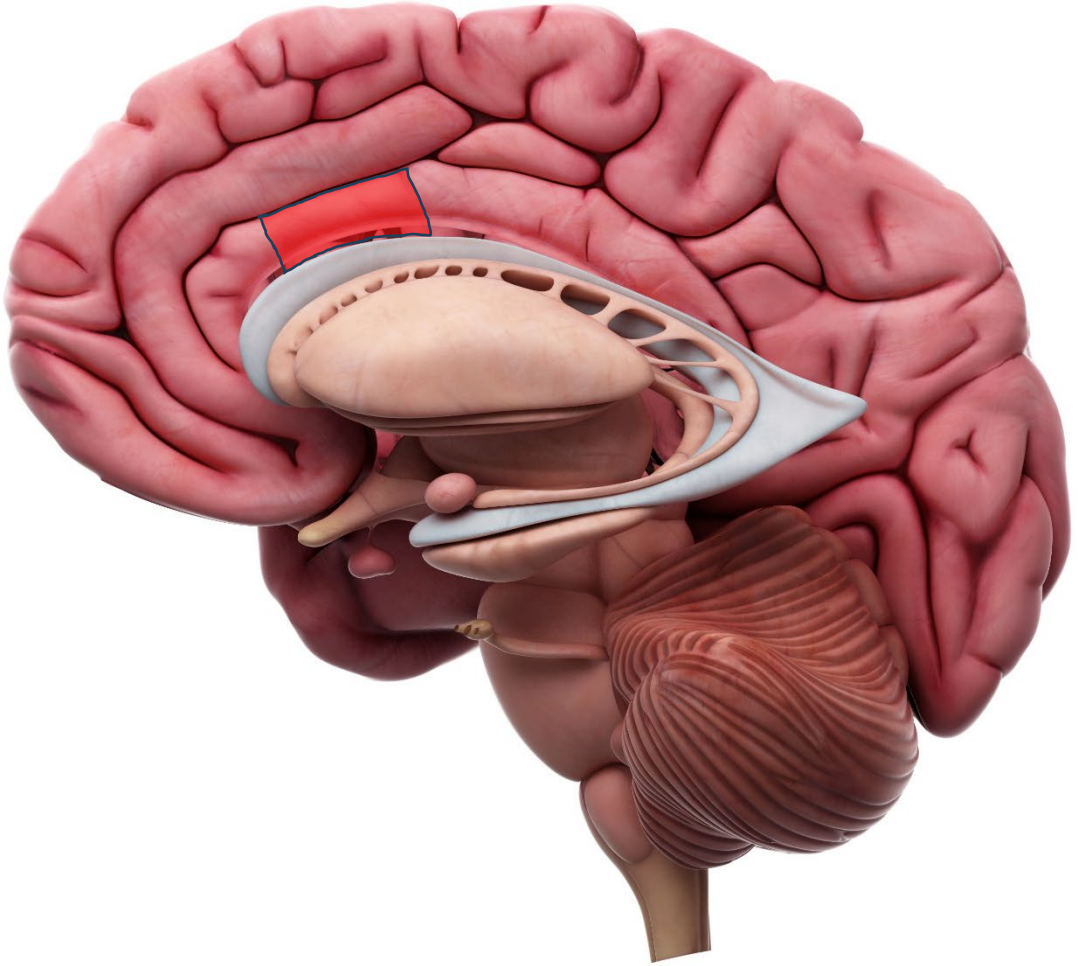
The Insular Cortex

- Key Interoceptive Cortex
- Interoceptive information integration – sensory information integration – limbic integration (posterior to anterior)
- Identifies salient signals – and initiates responses!
- Processes afferent responses to nociception



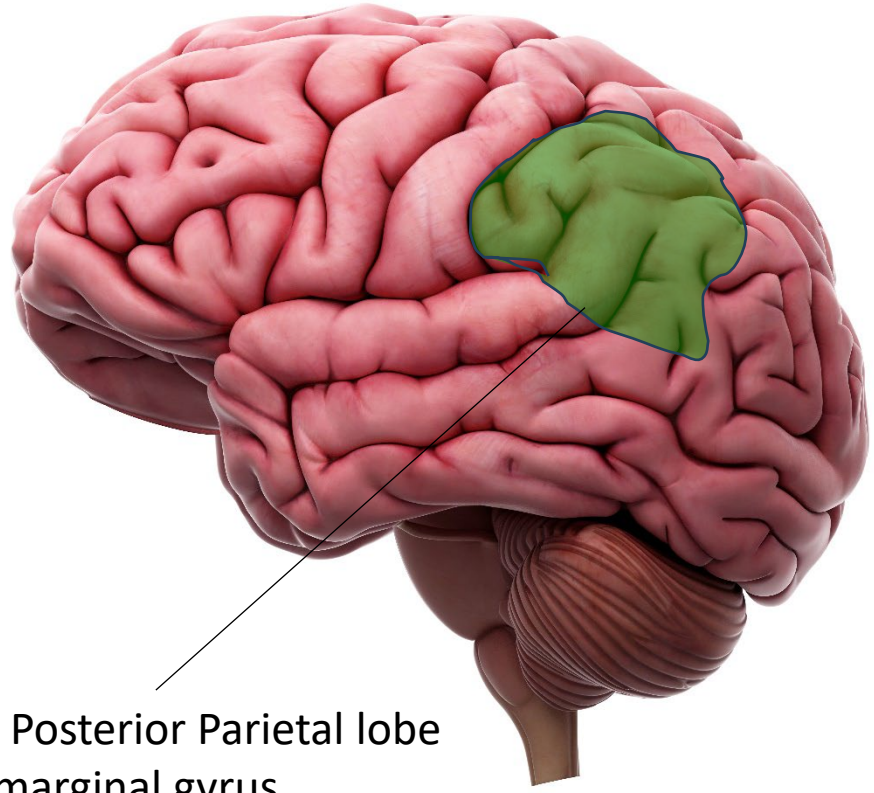
Dorsal Anterior Cingulate Cortex

- AKA Mid Cingulate Cortex
- Implicated in networks involving decision making, emotional salience, learning, reward processing, empathy, attention, intention, addiction, and the affective aspect of nociception (unpleasantness).
- Modulates attention, motivation, error detection and working memory
- Acts as switch between DMN and CEN



Default Mode Network

Understanding thoughts, intentions and feelings of others, and predicting behavior



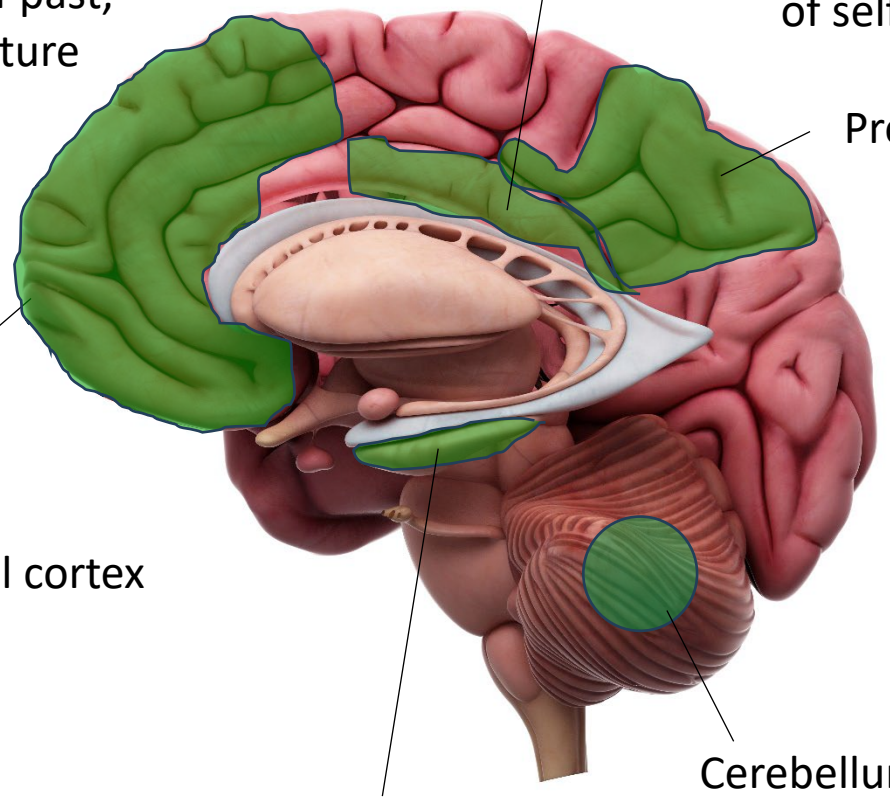
Inferior Posterior Parietal lobe
- Supramarginal gyrus
- Angular Gyrus

Emotional understanding & regulation of past, present and future

PCC

Constructing sense of self

Precuneus



Medial PFC
- vm PFC
- Orbitofrontal cortex
- Ventral ACC

Cerebellum

Hippocampus and Parahippocampus

HAAVIK RESEARCH

(Dumas et al 2014)

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Inferior Posterior Parietal lobe

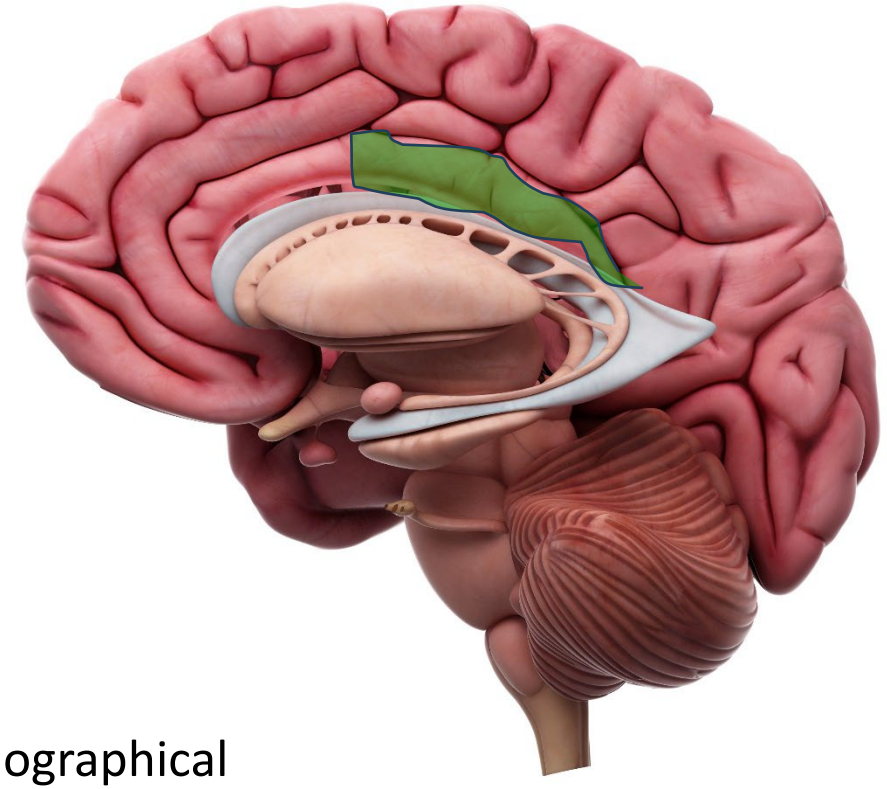


- Understanding thoughts, intentions and feelings of others, and predicting their behavior
- Mental imagery and episodic memory
- Supramarginal gyrus
  - Social cognition
  - Empathy
  - Perspective taking
  - Understanding thoughts, intentions and feelings of others
  - Language processing
- Angular Gyrus
  - multisensory integration
  - language processing
  - spatial cognition
  - numerical cognition
  - episodic memory retrieval
  - semantic processing

Posterior Cingulate Cortex

- Understanding of self (self-other distinctions)
- Creating narrative story of self
- Self-referential processing and Interoception
- Self – judgement
- Social decision making
- Spatial navigation
- Strong limbic connections
- Attentional modulation
- Vital for consciousness
- The construction of mental scenes while recalling autobiographical experiences and imagining future events

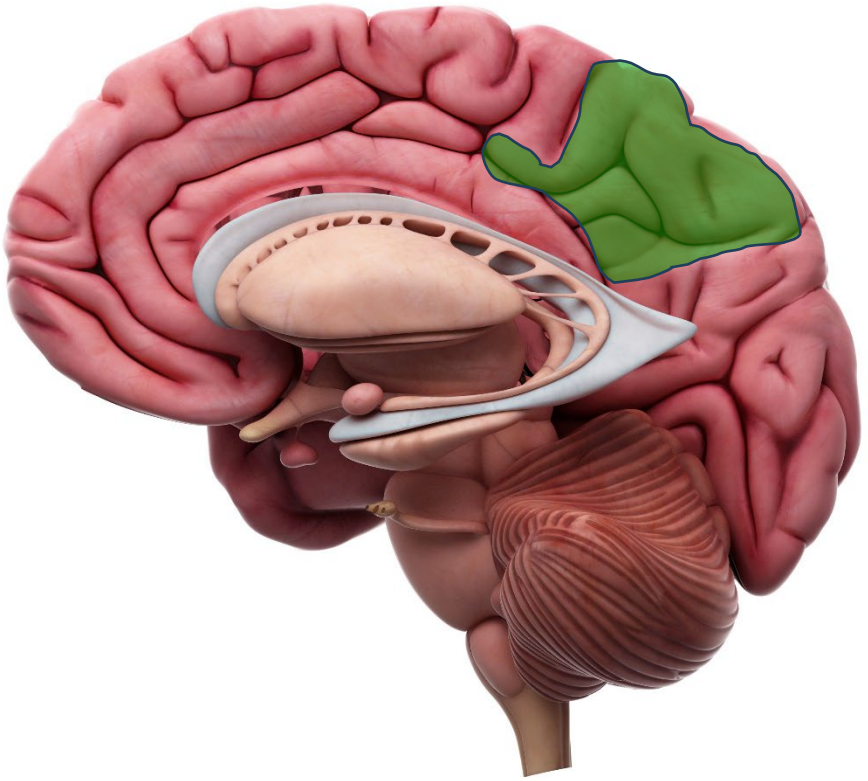
Isthmus abnormal in PTSD and Depression (increased)



Precuneus

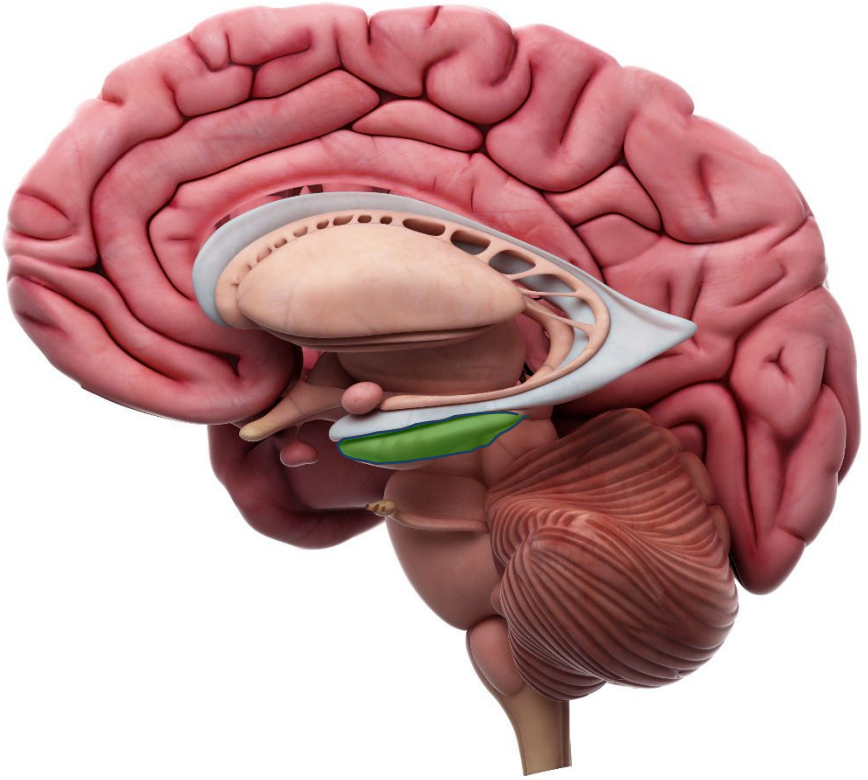
- Self-awareness
- Self-reflection
- Consciousness
- Response-inhibition
- Important for processing sensorimotor information
- Anterior Precuneus = HUB for Body schema
- Learning and consolidating everyday experiences (with hippocampus)

Increased precuneus – orbitofrontal connectivity has been found in unmedicated depressed people, though to reflect ruminations



Hippocampus and Parahippocampus

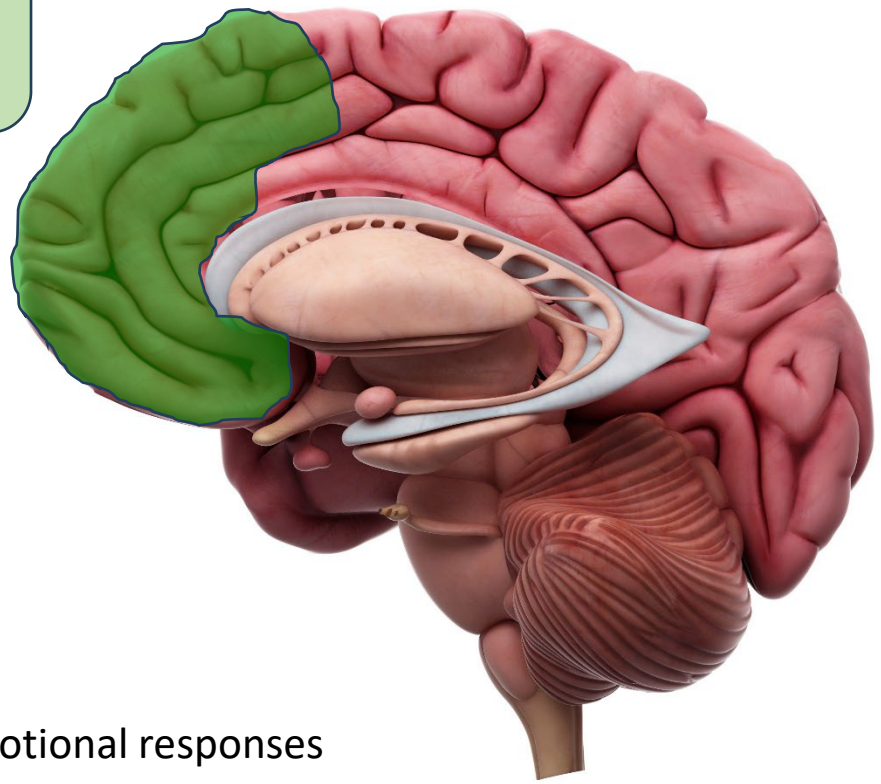
- Parahippocampus is found in medial temporal lobe surrounding Hippocampus
- Both essential for memory formation and retrieval (and adaptation)
- Spatial navigation, Scene perception & Object recognition
- Memory processing and retrieval and self-referential thinking
- ‘‘ongoing activity’’ during ‘‘resting state’’ is likely bringing events from the past to the mind
- The construction of mental scenes while recalling autobiographical experiences and imagining future events (along with the precuneus and PCC)



Medial Prefrontal Cortex (PFC)

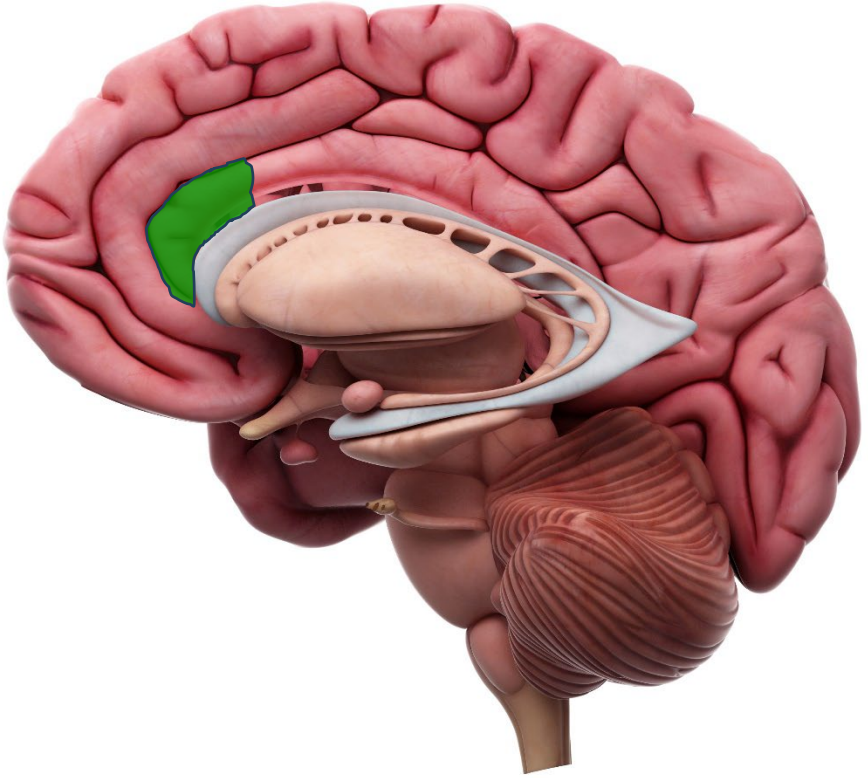
- Dorsomedial PFC
  - Self-referential judgements
  - introspection
- Ventromedial PFC
  - Emotional information of self and others
  - Personal information about self
  - Autobiographical memory
  - Future goals and events
- Orbitofrontal cortex
  - Evaluates sensory stimuli based on current goals and needs
  - External world schema (lateral OFC)
  - Suppression and modulation of pain (lateral OFC)
  - Evaluates imagined future actions/events (medial)
  - Social cognition (medial OFC)
- Ventral Anterior Cingulate Cortex
  - Assesses salience and emotional information and regulates emotional responses
  - Emotional awareness

Abnormal in Depression

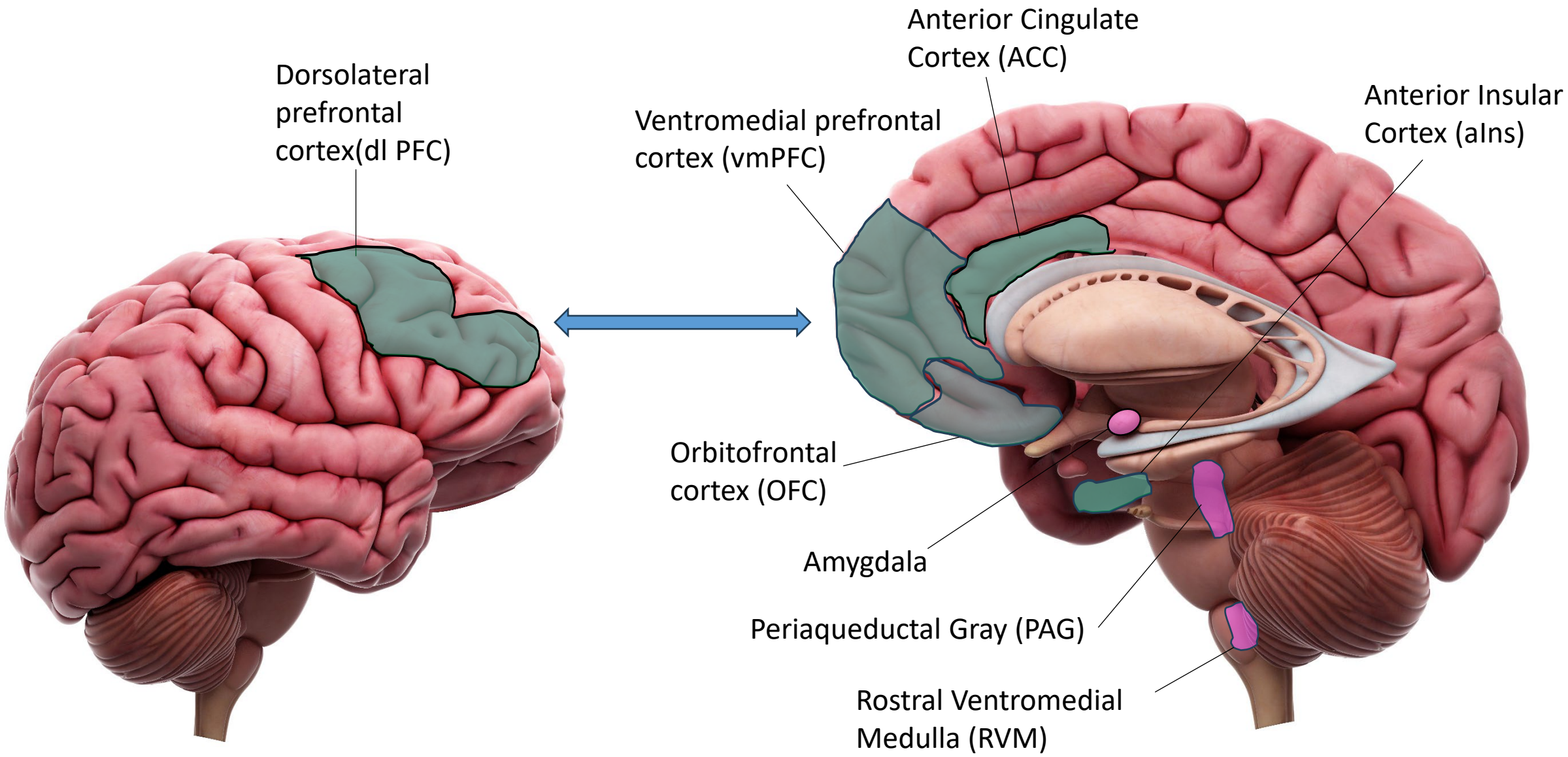


Ventral Anterior Cingulate Cortex

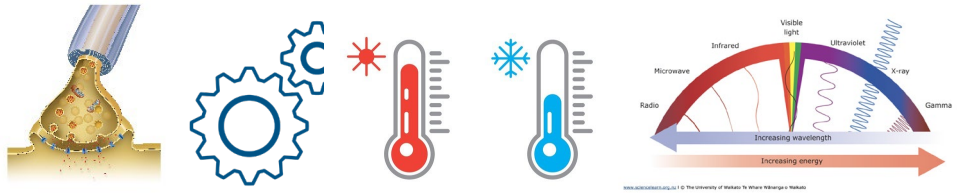
- Assesses salience and emotional information and regulates emotional responses (Emotional awareness)
- Strong Limbic connections (amygdala, hippocampus)
- Strong Orbitofrontal cortex
- Strong Anterior Insula connections (interoception)
- PAG (structure mediating emotionally salient stimuli such as pain!!)
- Nucleus Accumbens (reward regulating)
- Hypothalamus (ANS regulation)



Descending Pain Inhibition System

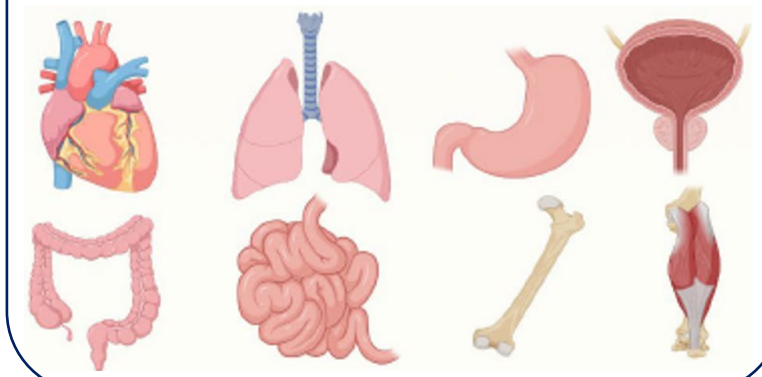


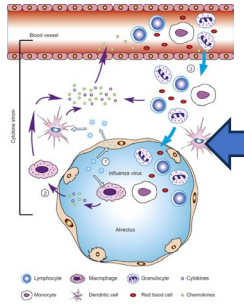
Interoception - Central Integration

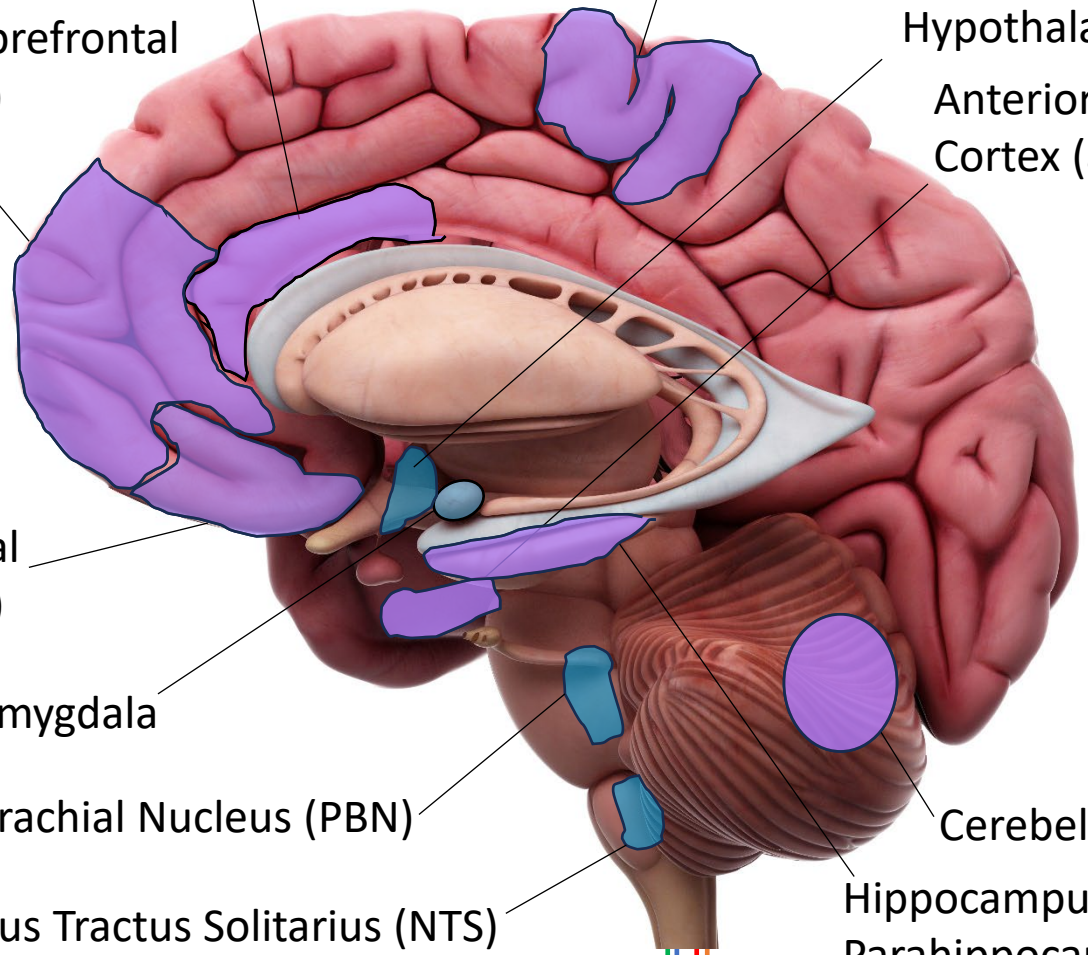


Biochemical, Mechanical, Thermal or Electromagnetic

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)

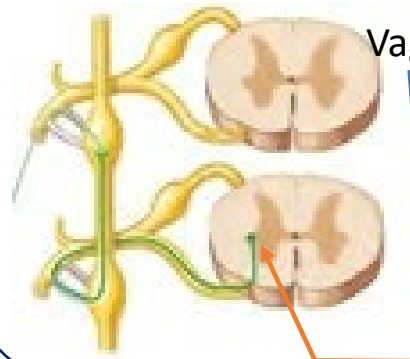
Cerebellum

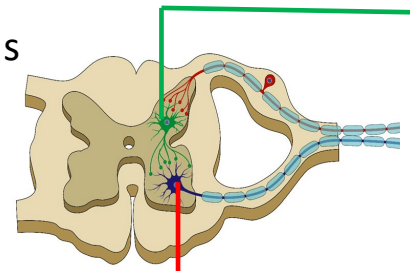
Hippocampus and Parahippocampus

ANS pathways

Spinal nerve pathways

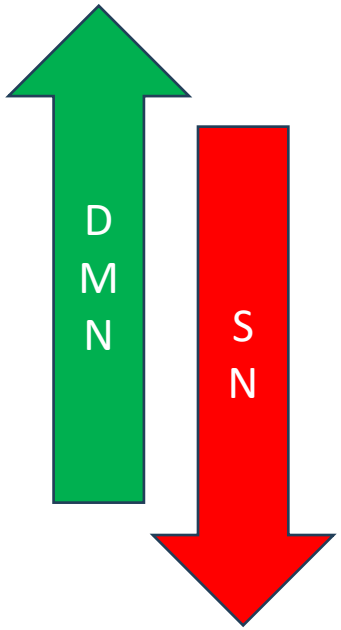
Vagas

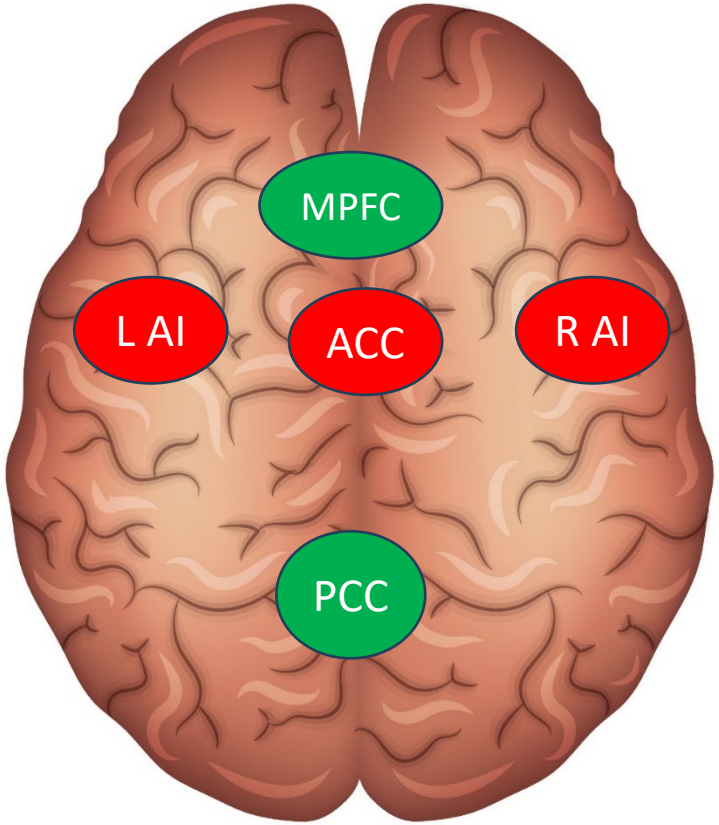


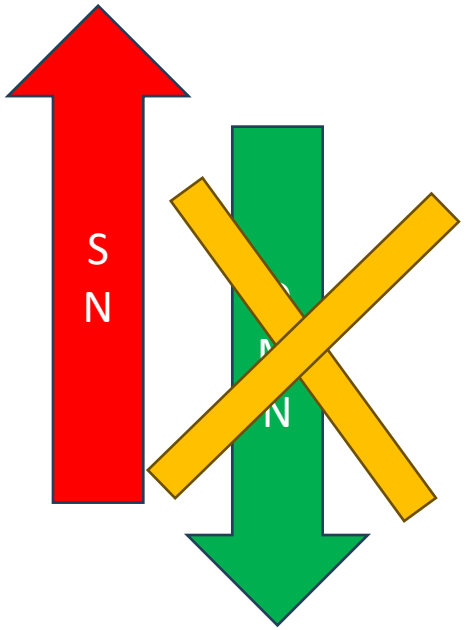


‘Normal’
‘Healthy’
Conditions

NOTE this changes in chronic problems!!







Mind wandering

Safety

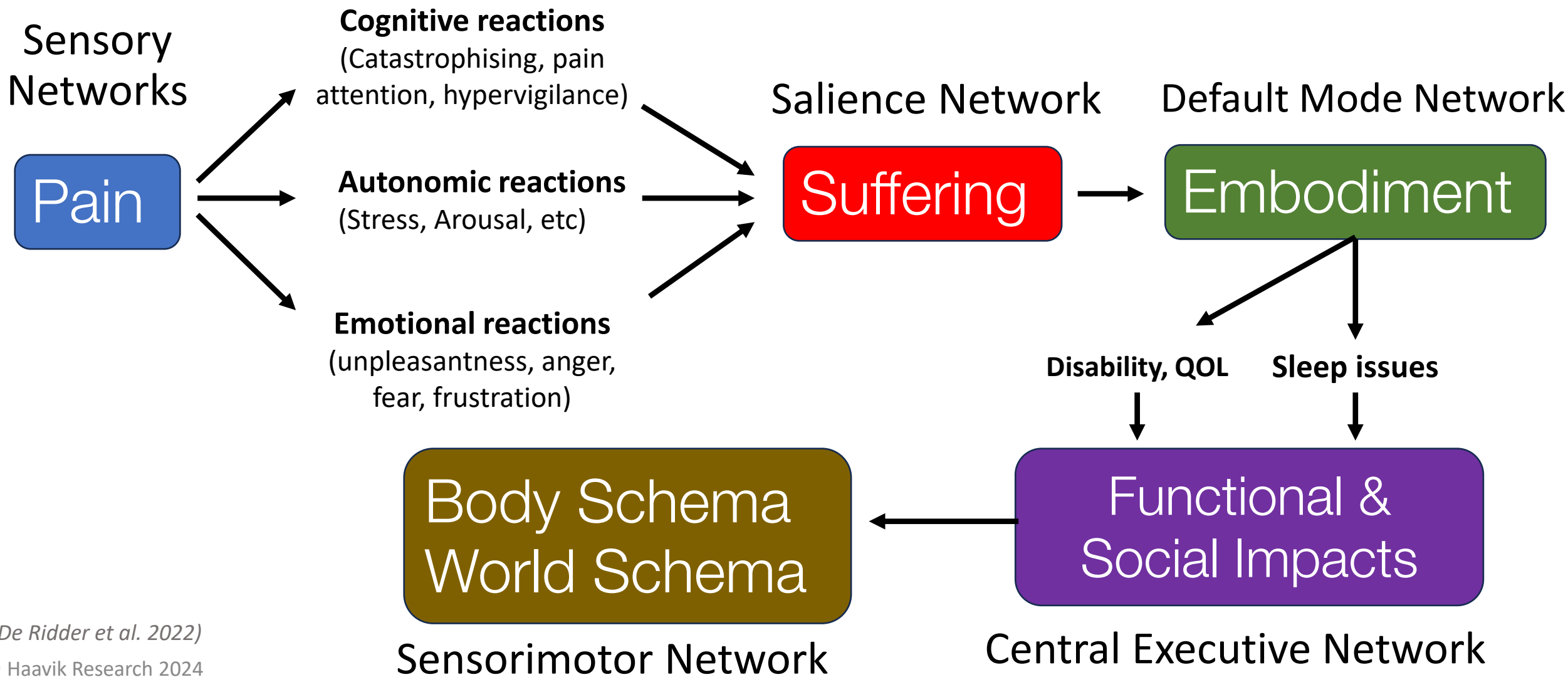
Threat

Paying attention to threat

(Adapted from Johansson et al 2023)

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The Chronicity of Pain



(De Ridder et al. 2022)

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Possibly to conserve energy?

- The sympathetic system increases energy consumption by 15–35%
- In acute pain, daily energy expenditure is increased by 60%
- Fear increases the daily energy expenditure by 22%

- Chronic anxiety only increases energy expenditure by 6%

- Thus, its possible “Energy expenditure could be reduced by rewiring the pain pathways to connect to the default mode network, which overlaps with the parasympathetic central network and disconnect from the energy consuming sympathetic nervous system.”



(De Ridder et al. 2022)

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Changes in Salience network in Chronic Pain

- Increased activity within SN in chronic widespread pain patients
- Increased cortisol increases unpleasantness by modulation of ACC
- Catastrophising can increase unpleasantness by altering ant Insula and ACC
- Increased anterior insula - DMN connectivity is strongly correlated to pain catastrophizing
- Perceived unpleasantness and catastrophizing leads to suffering
- This can lead to altered behaviors, including anger, fear, frustration, anxiety and depression as well as functional disability
- When suffering becomes chronic this leads to
  - Anxiety (SN(Amgdala) – DMN (dmPFC))
  - Depression (within ACC salience network)

Pain catastrophising

- Magnification of threat value of pain stimulus
- Sense of helplessness
- Rumination on pain thoughts and
- embodiment of pain

(van Ettinger-Veenstra, Lundberg et al. 2019; Kim, Mawla et al. 2019; De Ridder et al 2022)

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Changes in Default Mode Network with Chronic Pain

- Not deactivating under threat or pain stimuli
- Decreased anterior DMN – posterior DMN connectivity (may just be presence of pain)
- Hyper connectivity anterior insular cortex (Salience Network) - *medial PFC (DMN & SN)*
  - Degree of hyperconnectivity correlates with:
    - duration of pain
    - pain catastrophizing
    - Pain ruminating
  - This hyperconnectivity also occurs in Depression and Anxiety - common mechanisms
- Chronic LBP patients have hyperconnectivity between
  - S1 – SN
  - S1 – DMN (The longer pain exists the stronger the connection)
  - S1 - ECN
- *DMN changes explain why pain becomes embodied (part of self) and maintained after injury heals!!!*

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(Kuner & Flor 2017; Baliki et al 2015; Weiss 2016; De Ridder et al 2022; Jiang, Y., et al. 2016; Johansson et al. 2023; Brandl et al 2022; Kim et al. 2019)

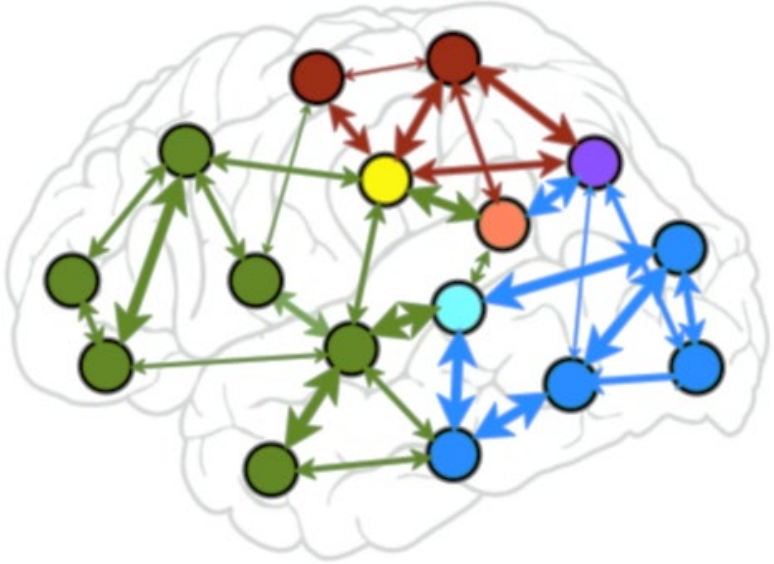
Changes in FPN / ECN in Chronic Pain

- Your thoughts, beliefs and expectations can influence your experience of pain
- The FPN / ECN is involved in guiding decisions and performance adjustment
- Chronic pain LBP
  - Hyperconnectivity amygdala(SN) – CEN/FPN (also found in anxiety; worse in those who catastrophise)
  - Hyperconnectivity S1 – ECN/FPN (and S1 – DMN)

(Jiang et al 2016; De Ridder et al 2022)

Characterizing brain network activity changes following chiropractic care using whole head electroencephalography (EEG)

















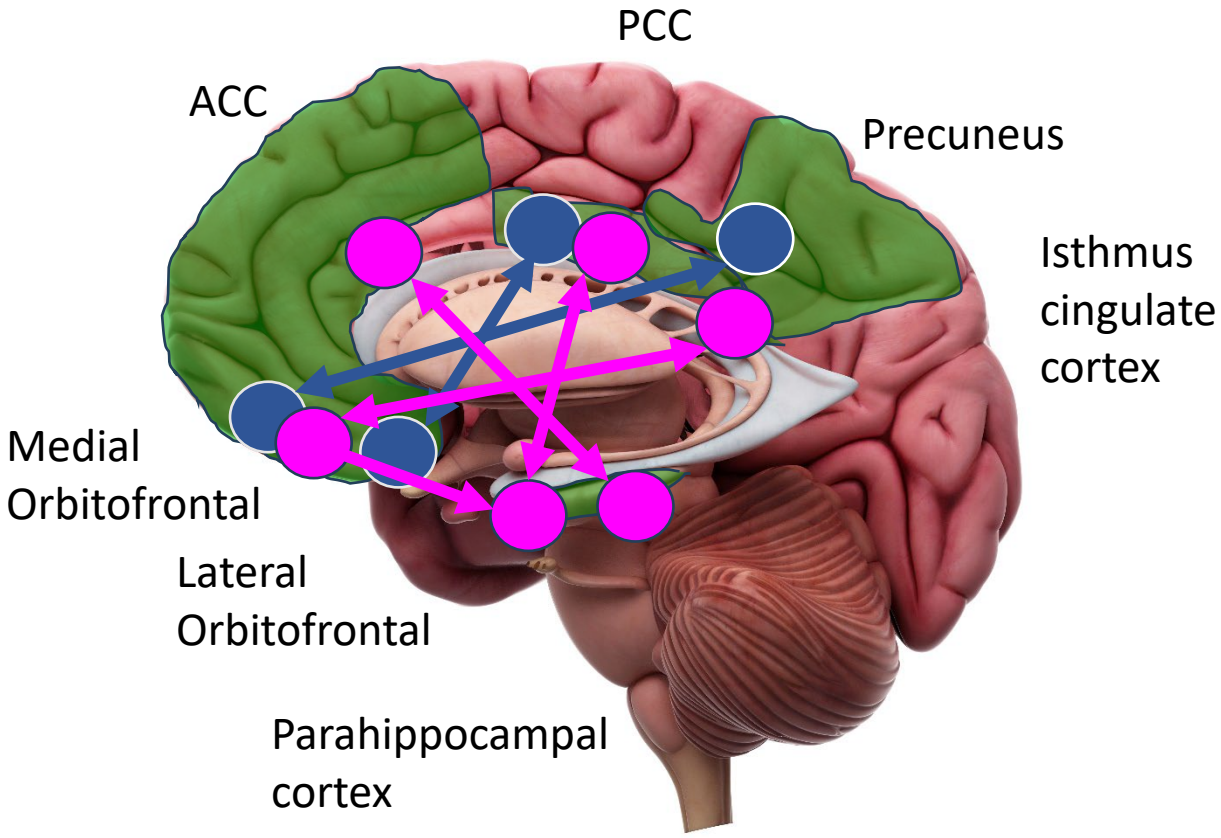


- As seen on Russell Brand show

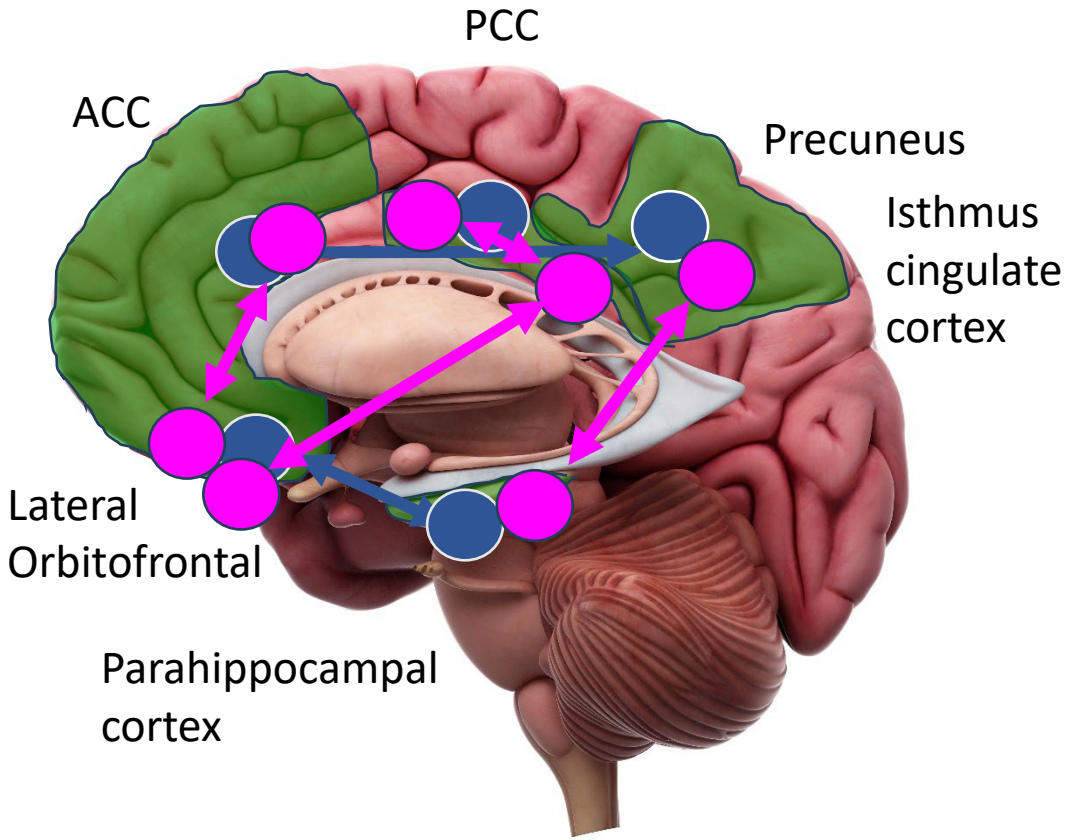
NEW ZEALAND COLLEGE OF CHIROPRACTIC

Default Mode Network Changes with Chiro

Pre and Post Chiro



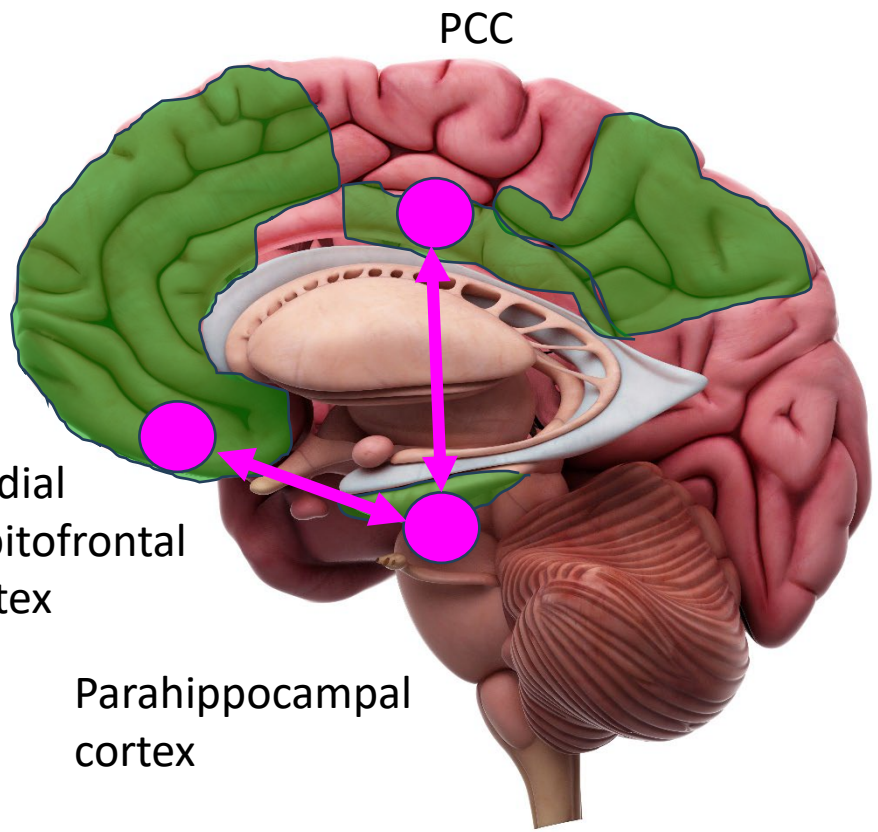
Pre and Post 4 weeks Chiro



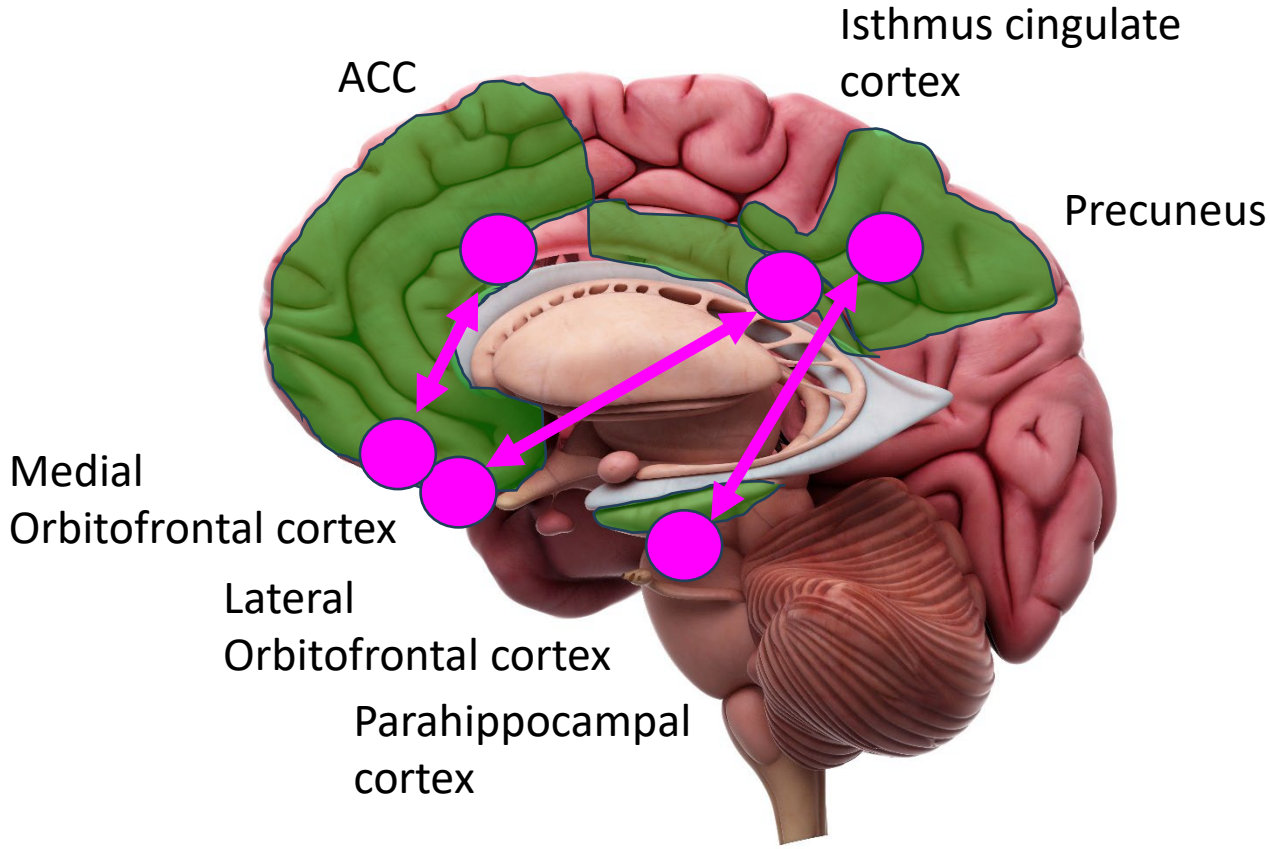
(Haavik et al 2024 submitted)

Resting EEG DMN changes

Pre and Post Chiro



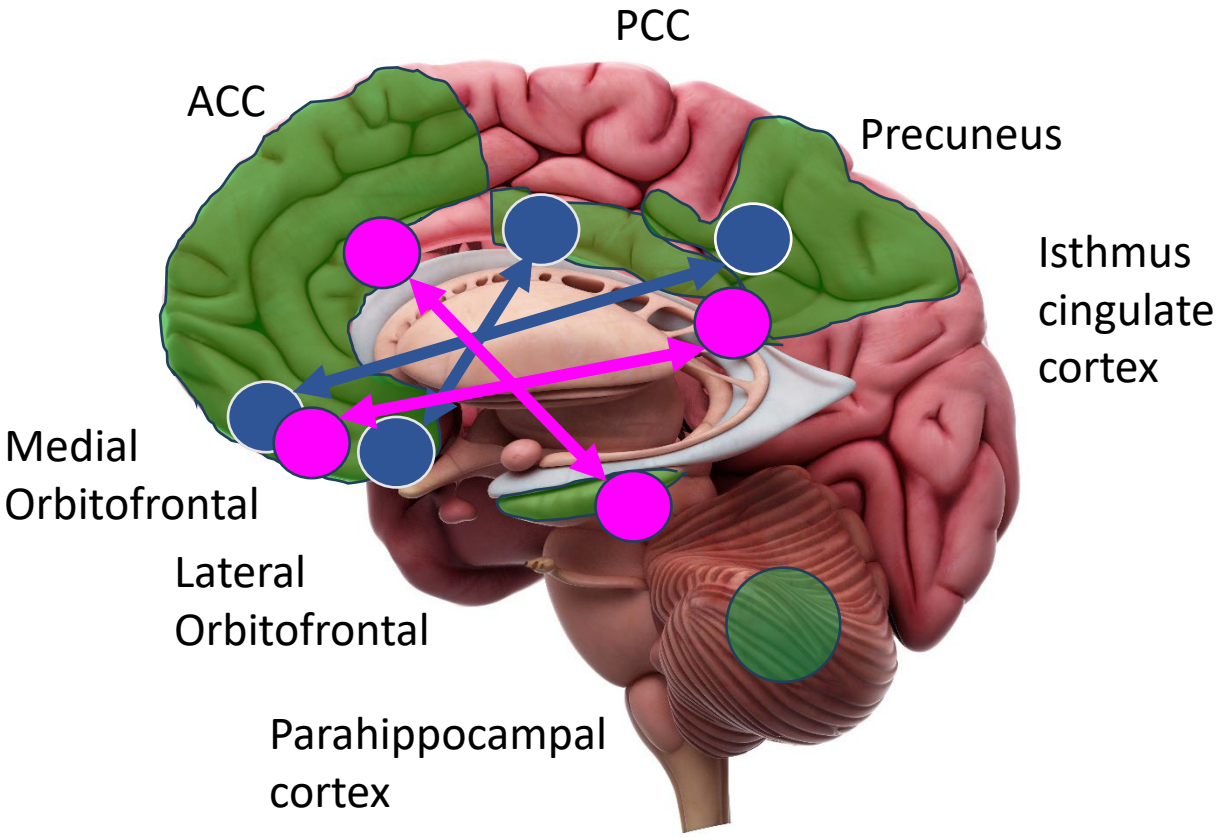
Pre and Post 4 weeks Chiro



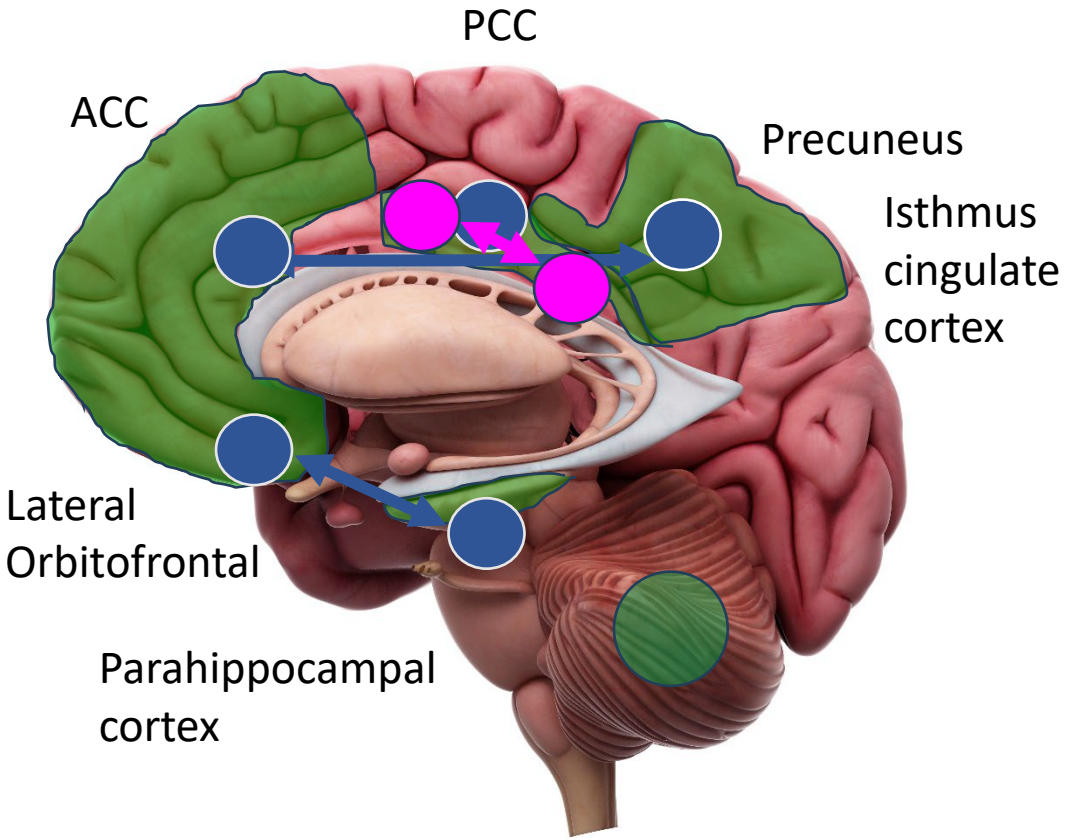
(Haavik et al 2024 submitted)

SEPs DMN changes

Pre and Post Chiro



Pre and Post 4 weeks Chiro



(Haavik et al 2024 submitted)

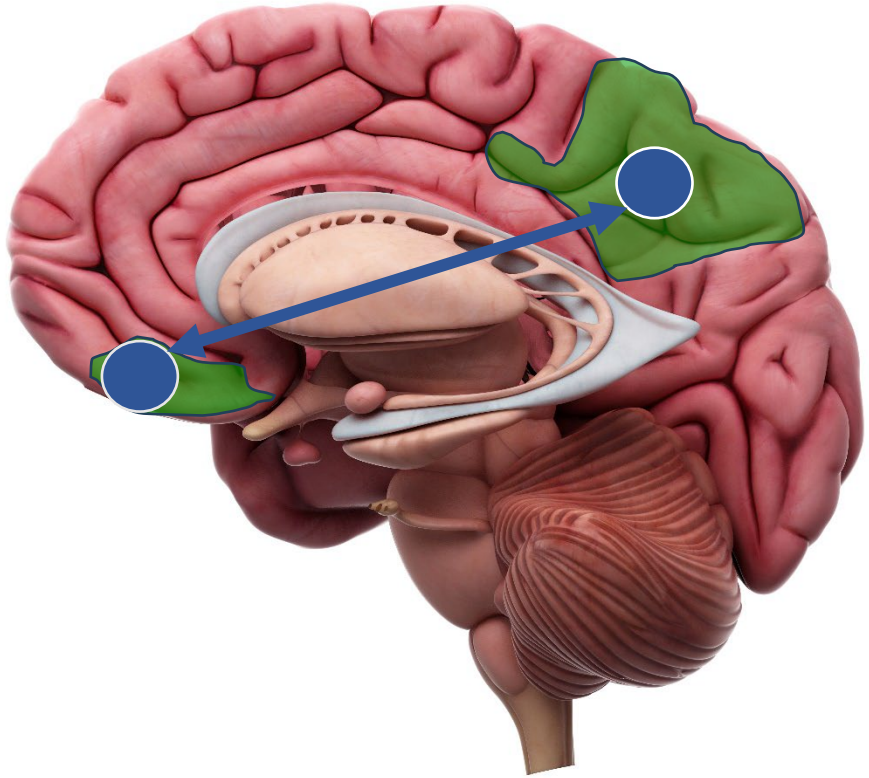
PRE vs POST First Adjustment Session

SEPs Beta ↓ R Medial-orbitofrontal - L Precuneus

May reflect the changes in body schema (and external world schema) from the spinal adjustments also altering the participants mental states, introspection and their constructed sense of self

Medial orbitofrontal

- 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
- Has reduced functional connectivity in depression
- Imagines future events



Precuneus

- Self-awareness, self-referential processing and self-reflection
- Constructing sense of self
- Visuospatial integration
- Anterior Precuneus = THE HUB of Body Schema
- INCREASED in disc herniations
- Decreased following SM in disc herniation patients (Du et al 2024)

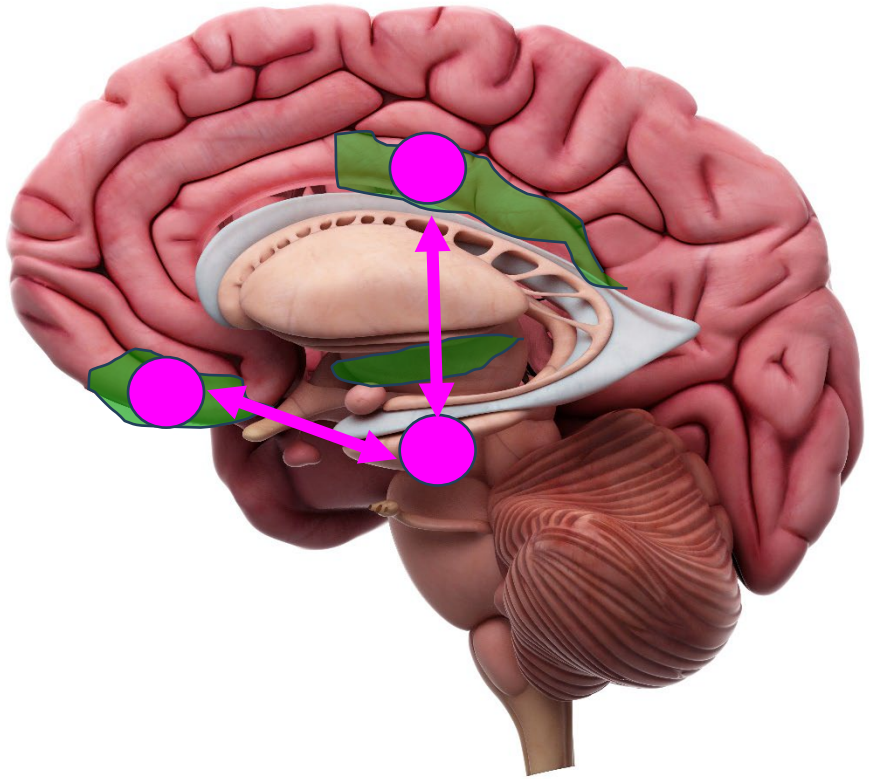
(Haavik et al 2024 submitted)

PRE vs POST First Adjustment Session

rEEG Alpha ↑ R Parahipp – R PCC Alpha ↑ L Parahipp – R mOFC

Most likely reflects a state of heightened introspection, emotional and spatial awareness or internally directed cognition, and improved mood after the adjustment.

- **Medial Orbitofrontal cortex**
  - Processing info about own mental state, beliefs, intentions & desires
  - Introspection and sense of self
  - REDUCED in depression
  - REDUCED in disc herniations
- **Parahippocampus**
  - Memory formation & retrieval
  - Emotional modulation of memories
  - Spatial navigation, object recognition & scene perception.



- **Posterior Cingulate Cortex**
  - Navigation & spatial memory
  - Emotional awareness and regulation
  - Construction of narrative sense of self
  - Internal, self-referencing thoughts

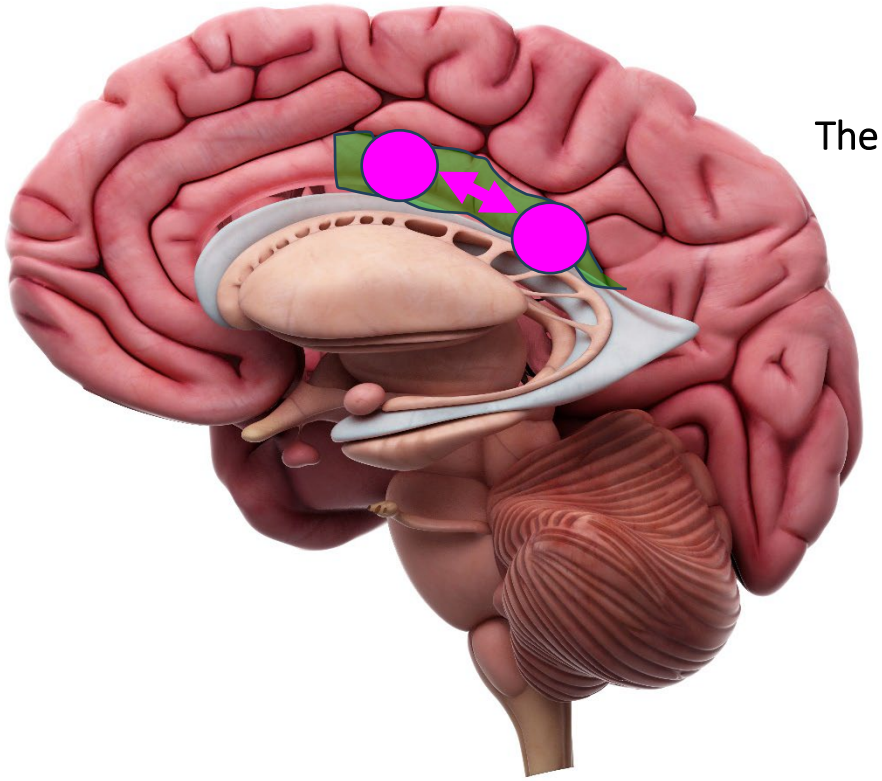
(Haavik et al 2024 submitted)

PRE vs POST 4 weeks of chiropractic care

SEPs Alpha ↑ L isthmus-cingulate- R PCC SEPs Alpha ↓ L PCC – R PCC

Thus, may reflect altered narrative sense of self in a manner that is reducing symptoms of depression and improvements in fatigue

- The Posterior Cingulate Cortex
  - internally focused, self-referential processing
  - implicated in depression
- 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



The isthmus cingulate
- introspection and self-referential processing
- construction of the narrative sense of self, including autobiographical memories

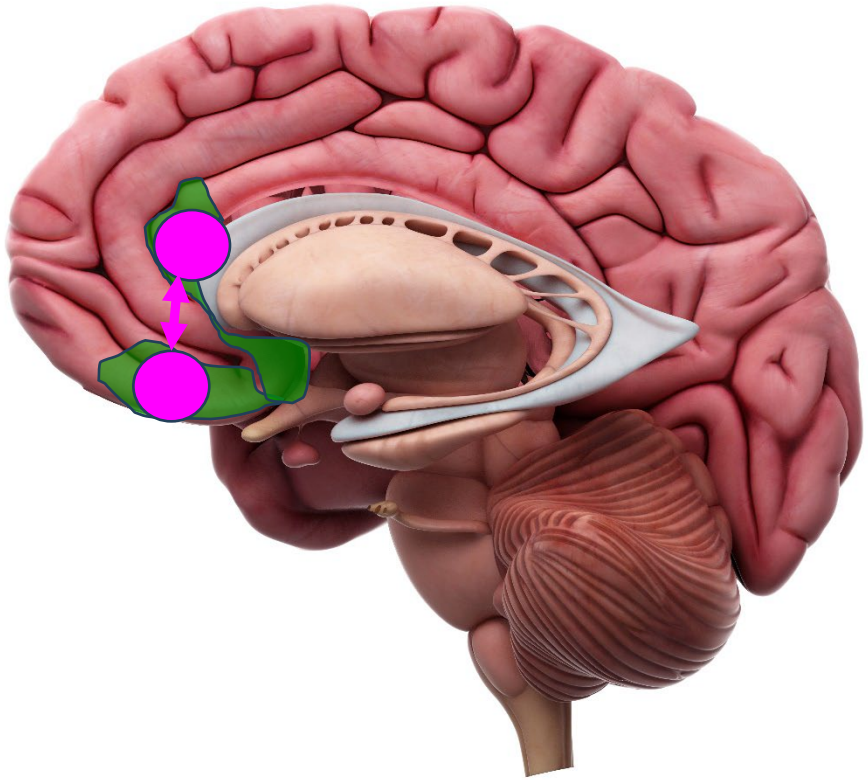
(Haavik et al 2024 submitted)

PRE vs POST 4 weeks of Chiropractic care

rEEG Alpha ↑ L rostral ACC – R Medial-orbitofrontal Alpha ↑ L rostral ACC - L Medial-orbitofrontal

Most likely reflects the reduction in pain and improved cognition about their own mental states and improved mood.

- 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
  - Has reduced functional connectivity in depression
  - Imagines future events
  - REDUCED in depression
  - REDUCED in disc herniations



(Haavik et al 2024 submitted)

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

- ACC involved in both the Salience and DMN and they have abnormal functional connectivity in people with chronic pain, depression and anxiety.



12 publications coming just from these three RCTs!!

But how do you communicate this to the public?

- I would NOT use the big words I have used today
- I would talk about
  - Rebooting the brain like a computer
  - Reprogramming the brain
  - Allowing the brain to recalibrate



HAAVIK RESEARCH

I bet most of you have a spine model in your practice!



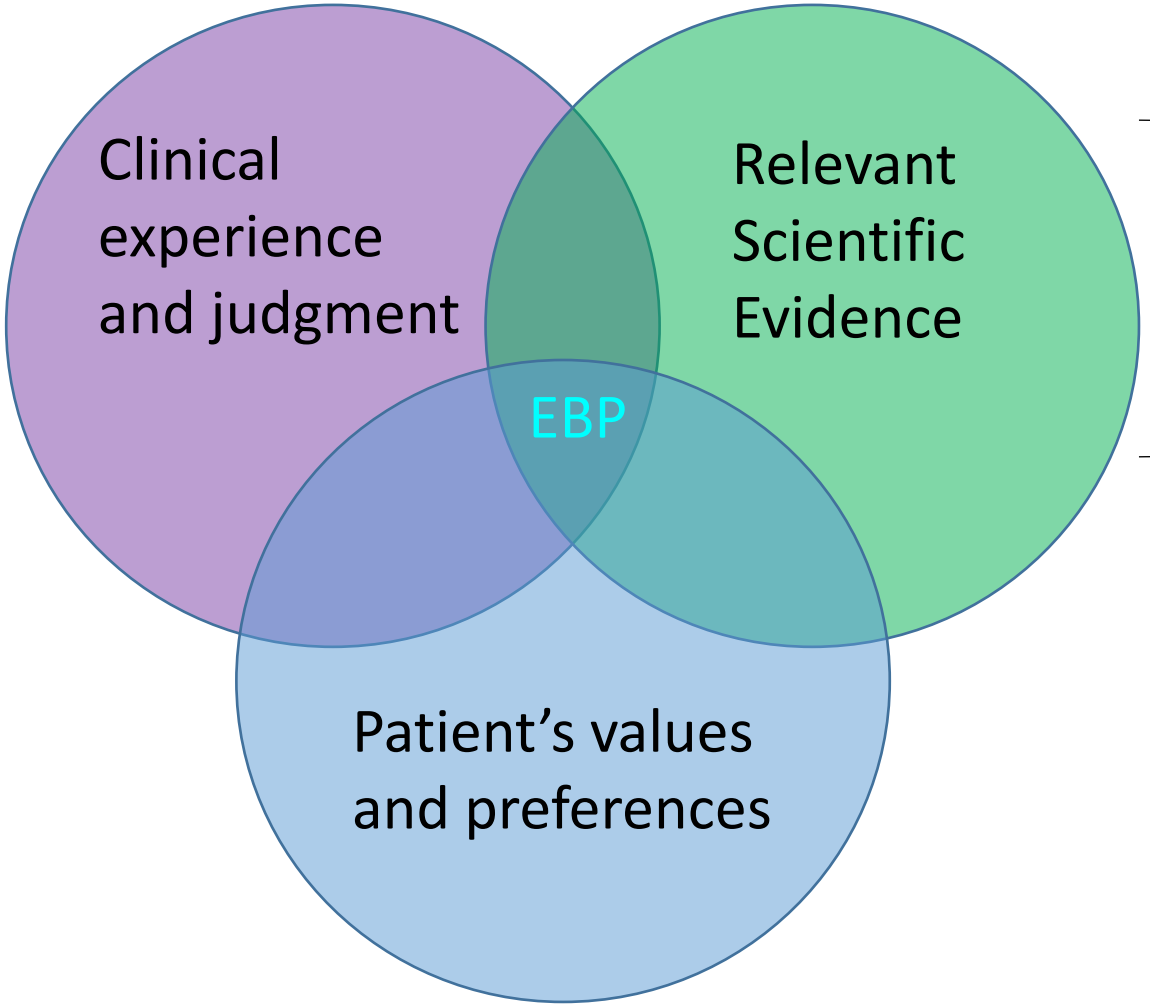
Do you have a brain model in your practice?



HAAVIK RESEARCH

Patient-Focused, Evidence-Based Practice

Dr David Sackett - The father of evidence-based medicine



1. What the condition is
2. How your care works

Basic Science

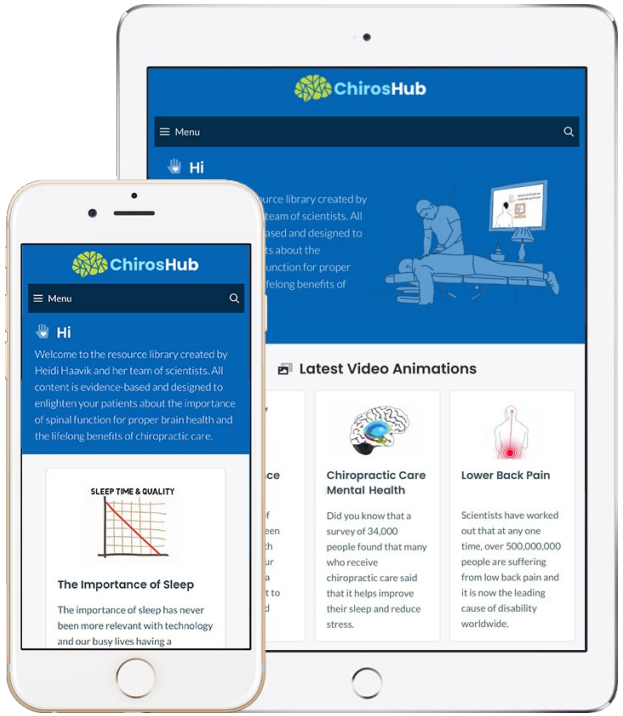
3. The efficacy & safety of chiropractic care
4. The efficacy & safety of current medical care

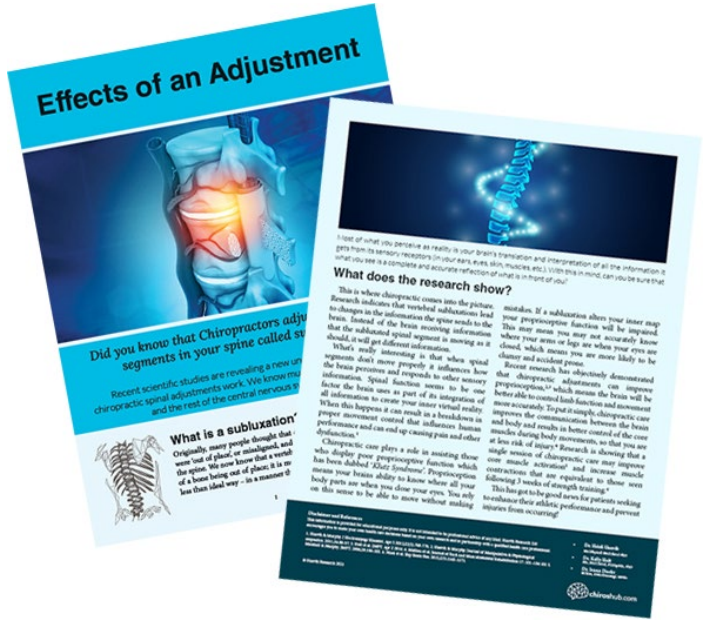
Clinical Science

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ChirosHub

Built to help you implement the brain model of chiropractic in practice







- 50+ videos to use on website / social channels
- Chiropractic research articles fully referenced
- Posters, screensavers and digital resources

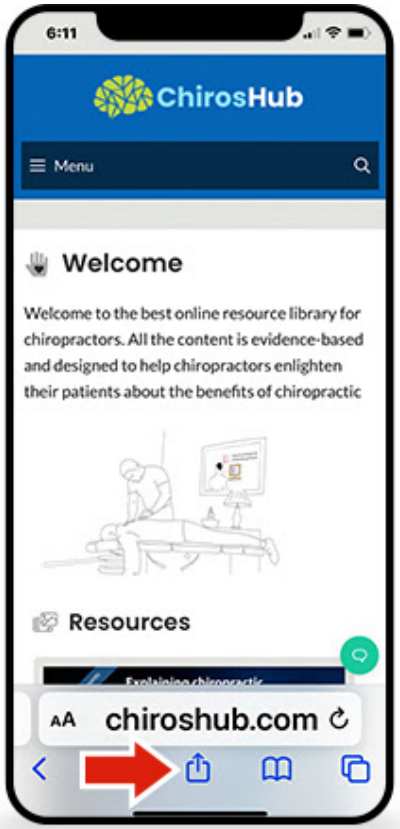
And much more for Gold Members

1



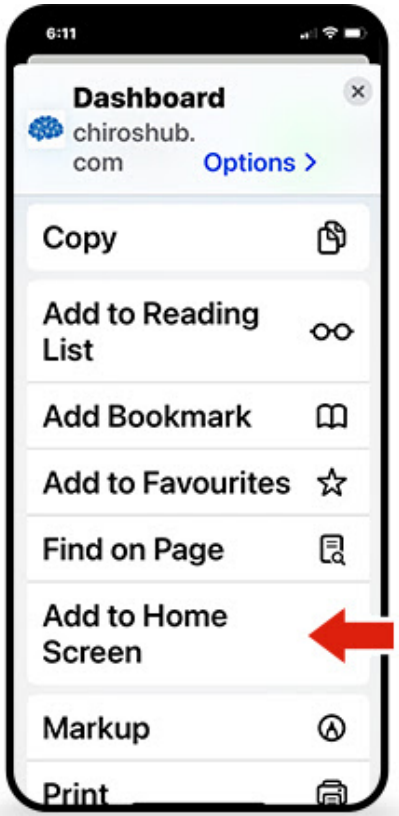
On your smart phone click on Safari and type in ChirosHub.com

2



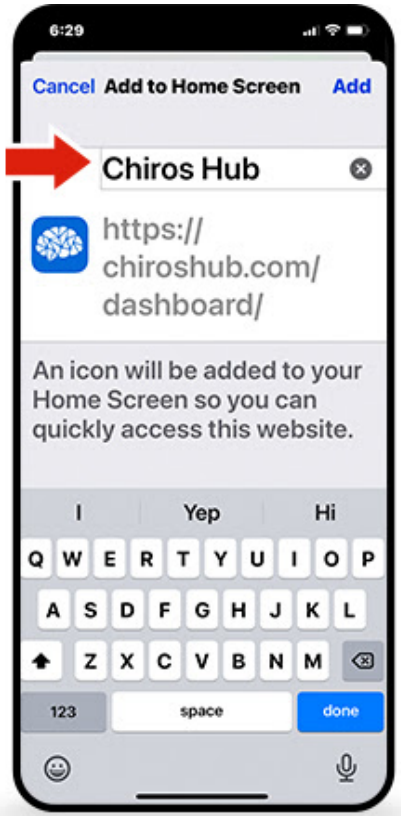
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3



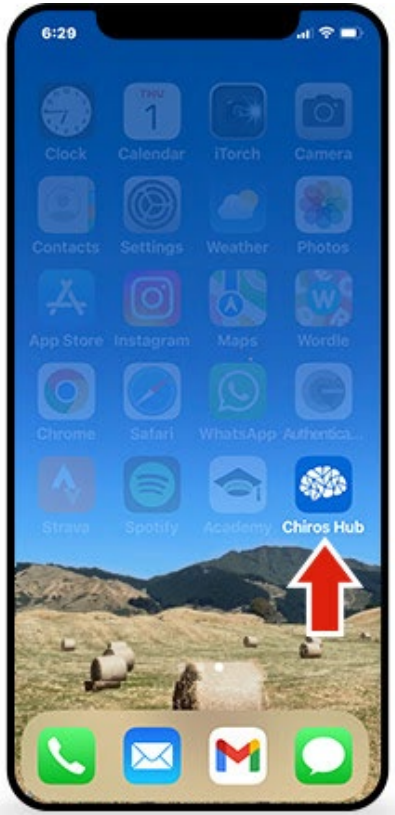
Click on ‘Add to Home Screen’

4



Change the name to ‘Chiros Hub’

5

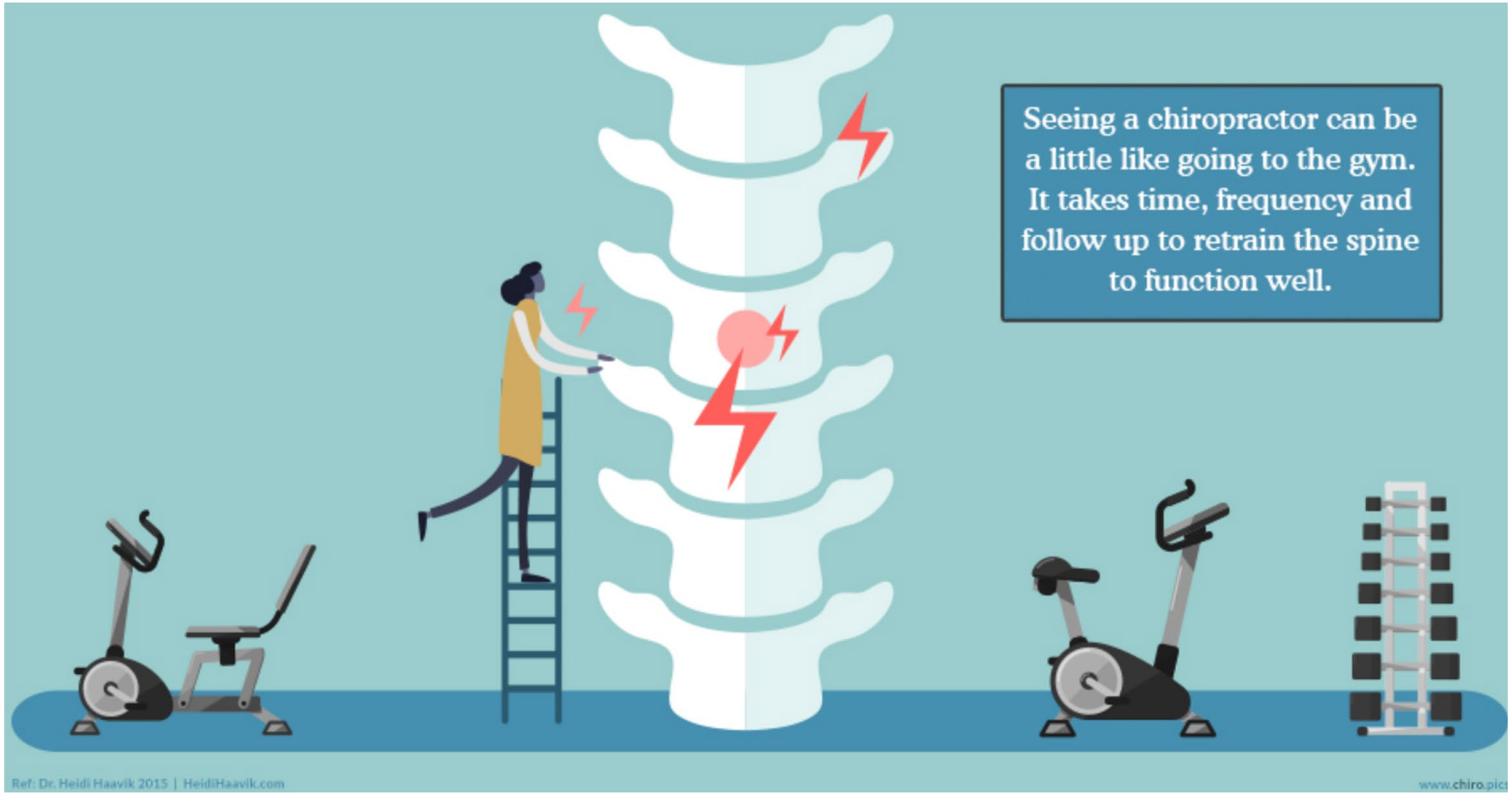


Chiros Hub will now appear as an App on your phone!





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Print and digital resources

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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



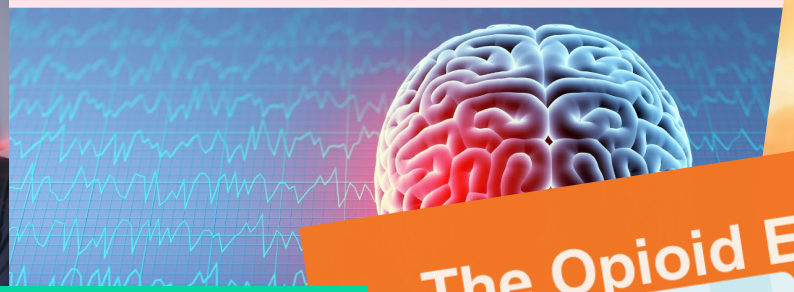
Healthy Ageing



Neck Pain



Pain is Created in the Brain



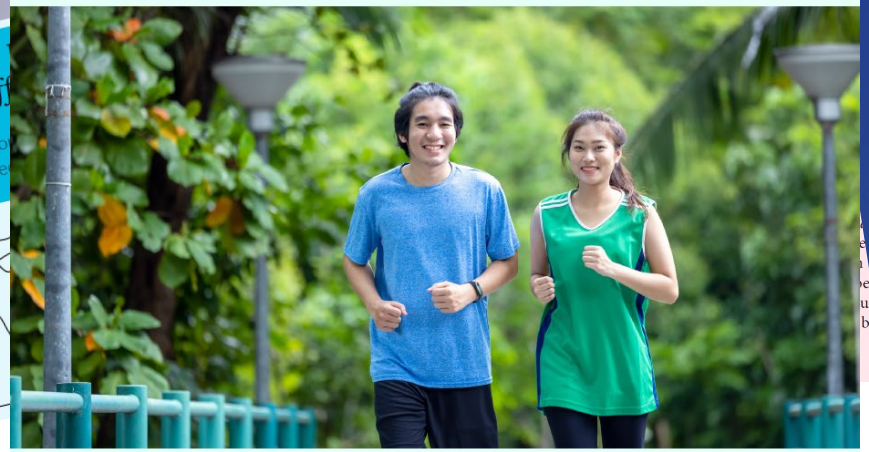
Understanding Pain



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

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

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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

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DO YOU OWN YOUR SCIENCE?

ChirosAcademy

Included in ChirosHub Gold and Platinum Membership!!

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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...

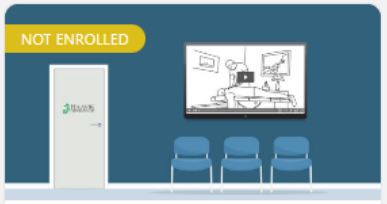
76 Minutes - How a healthy and a dysfunctional spine communicates...

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



11 Lessons

BS1.03 Your first visit to a Chiropractor

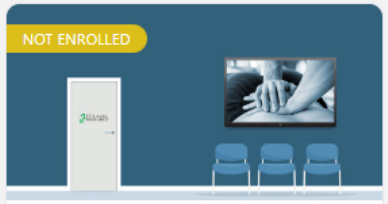
45 Minutes - What to expect from your first visit and "what is that...

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...

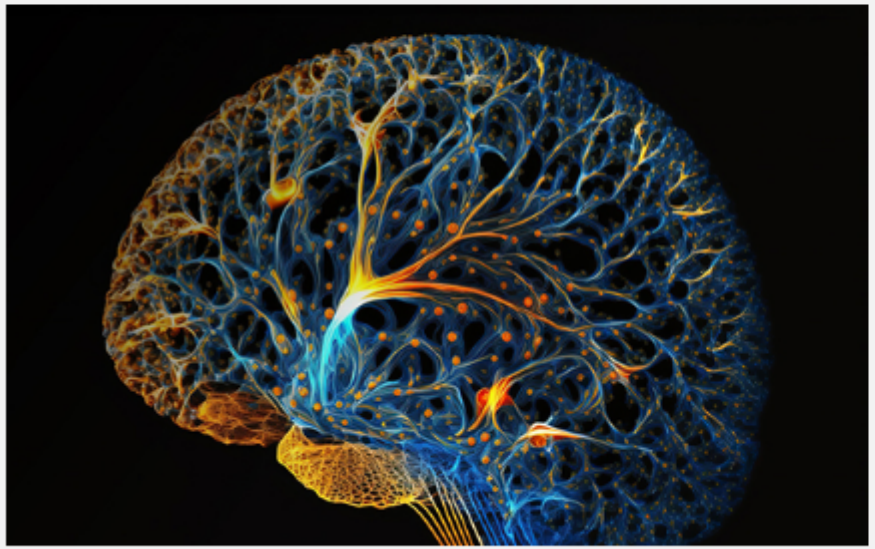
66 Minutes - Chiropractic studies have shown adjustments can change...

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.



5 Lessons

NS1.07 Sensory Processing and Integration

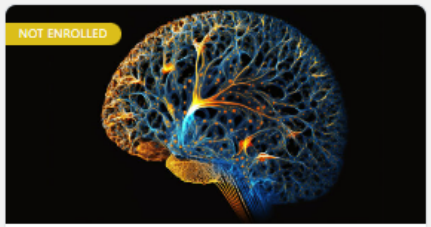
60 minutes - a deep dive into the realm of Sensory Processing Integration.

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



5 Lessons

NS1.08 Neural Plasticity

49 minutes - the cellular mechanisms that underpin neural plasticity

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



5 Lessons

NS1.10 The Prefrontal Cortex

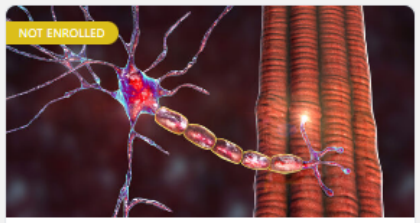
63 minutes - a nexus of neurological brilliance that shapes the very essence of our human experience.

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



6 Lessons

NS1.14 The Muscle Fiber and Neuromuscular Junction

49 minutes - learn about the anatomy of skeletal muscles down to the individual muscle fibers

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



6 Lessons

NS1.30 The Neurobiology of Stress and Trauma

61 minutes - understand the impact of stress and trauma on the human brain and body.

Dr Heidi Haavik

0% Complete
0/0 Steps

See more...

$24.00



Dr Heidi Haavik



Dr Kelly Holt



Dr Nitika Kumari



Dr Imran Khan Niazi



Dr Jenna Duehr



Dr Tanja Glucina



Dr Usman Ghani



Dr Alice Cade

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Dr Samran Navid



Dr Usman Rashid



Dr Imran Amjad

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New Zealand College of Chiropractic



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