Ariadne's Thread: the Labyrinth of our Body-Mind

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"Back to the labyrinth where either we are found or lose ourselves forever."
W.H. Auden

This article aims to trigger conversations about neuroscience to develop more interest and research into the labyrinth effect. The purpose is to show the mind-body link and highlight the role of the major key senses and organs in our body that respond to the calm regular walk in the labyrinth and the physiological part they play in our psychological experiences.

This began when I wondered why the labyrinth symbol has been around since the Bronze Age and the significance of Ariadne and the red thread she lovingly gave to the hero in the metaphor of Theseus slaying of the Monster in the labyrinth of King Minos? Did the ancient Greeks and our earliest forefathers know about anatomy and the physiological effects of order? They most certainly understood the beauty and order of the divine or golden ratio/phi, but that is for another day.

It is my contention that modern science can reveal more about the way our inner nervous system works, the internal processes and the molecules of emotions that may lead to the insights and resolution of problems often reported to result from a walk in a labyrinth. Do you remember the skeleton-dance, that fun song for learning bony parts of the body? Our bones hold us upright. But there is more. I believe the thread Ariadne gave Theseus might be likened to our nervous system that links the senses and organs in our body and our subconscious. When you step on to the labyrinth outside you are, at the same time, transitioning into the labyrinth of our nervous system inside.

Neuroscientists have provided clues. Dr. Stephen Porges' book *The Polyvagal Theory* says "that the body feels everything first through sensations. Then these get translated into emotions. The next phase of this process is when we form thoughts to make sense of our emotions."[1] Andrew Huberman, from Stanford University School of Medicine, explains in detail how the organs of the body influence the function and health of our brain and how our brain controls our bodily organs in his podcast *How to Optimize Your Brain-Body Function & Health*.[2]

The brilliant molecular biologist, Candace Pert, said that the peptides that flood our bodies are, in fact, molecules of emotion. She proposed that emotions, largely ignored within the traditional confines of science and medicine, are the key to understanding psychoimmunology's emerging picture of how body and mind affect each other by sensory processing or interoception.[3]

It became my contention that tranquilizing vibrations may be activated by slowly walking the garden labyrinth. That motion energises the sensory systems of the vestibular labyrinth in our inner ear and sends calming waves via the vestibulocochlear nerve to a variety of targets, including the cerebral cortex. It leads our psyche through the very complex maze of the wandering vagus nerve in our bodies to the portal of our subconscious as neurons communicate with each other.[4]

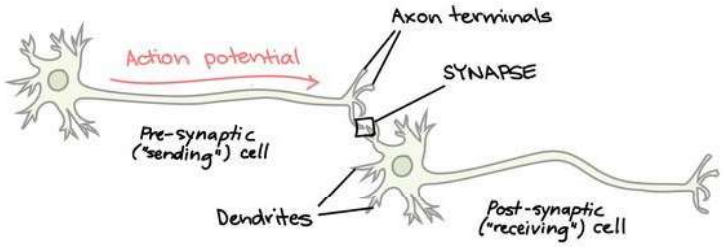


Image: www.khanacademy.org

How neurons communicate with each other at synapses, chemical vs. electrical synapses.

Here in our subconscious, confined in the dark inner recesses of the human psyche, may be the chaotic monsters that terrorise us, the real dangers of psychosis, major depression and debilitating mental disorders that may block our way.

"How beautiful the world would be if there were a procedure for moving through labyrinths." Umberto Eco

Slowly walking a labyrinth with intention, we may find our nerves are calmer and we can develop equilibrium and better management of the disturbances of our psychological homeostasis.

I wanted to know if, why and how a regulated, rhythmic calm walking exercise might stimulate a wave of ordered energy in the vestibular labyrinth in our inner ear and engage with all other senses and take our psyche from the outer world of the labyrinth path into our inner body. I first set out to learn a little more about our vestibular system. A short neuroscience video was a good start.[5]

Could it be that, vibrating to the ordered pattern of the labyrinth walk, nerves, neurons and neurotransmitters make a connection with our psyche through our organs, to find source, the oft reported inner wisdom, stored in the cellular memory of our subconscious mind in the body-mind dialogue called interoception?

A calm walk in the labyrinth may help us to quieten the insatiable chattering, noisy, monkey-mind bopping around from one thing to another and in the gaps of silence we may become aware that our body is our subconscious where every cell is a databank of memories which, according to Carl Jung's book *Man and His Symbols*, house the wisdom of our ancestors.[6]

The vestibular system in our inner ear is a very complex neuronal network of nerves and neurotransmitters which influence a broad range of stress responses and play a role in balance and anxiety disorders, memory consolidation and cognitive functions. An article for the neuro scientifically challenged was about my level.[7]

The regular rhythmic physical movement of a walk in a labyrinth creates pressure waves and vibrations that shift the perilymph and endolymph in the vestibular labyrinth and connects with neurotransmitters informing the parasympathetic nervous system through the energy system of the vagus nerve and meridians to every cell in our body.

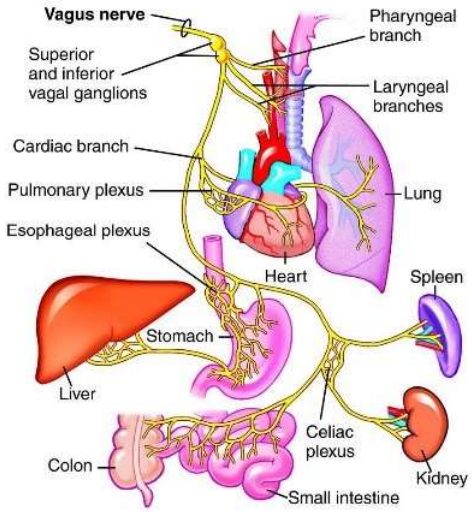
The vestibular labyrinth. Image: Blausen.com, WikiJournal of Medicine

Impulses are transmitted via about 100 billion neurons. Neurons, impulse-conducting nerve cells are the fundamental units of the brain and nervous system, the cells responsible for receiving sensory input from the external world, for sending motor commands to our muscles, and for transforming and relaying the electrical signals at every step in between.[8]

Neurotransmitters and neuropeptides, often referred to as the body's chemical messengers, are the molecules used by the nervous system to transmit messages and signals between neurons, or from neurons to muscles and these influence brain and the body functions.[9]

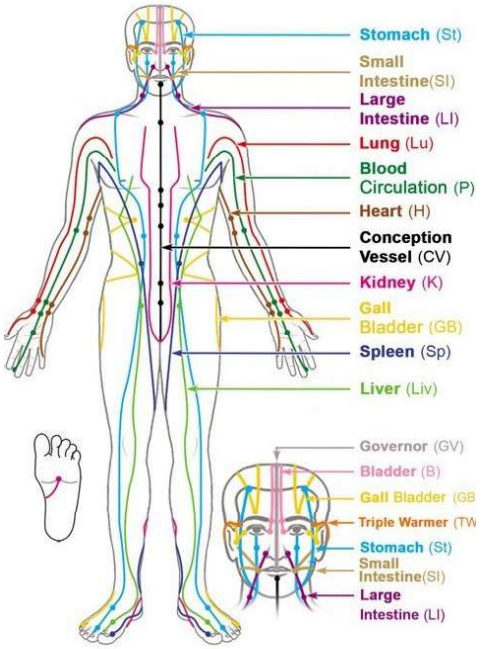
Today, when we look in a microscope, we see an intricate network of billions of neurons in constant, vibrating communication. These neurons and neurotransmitters mirror the world from outside to within. Movements send signals from the vestibular labyrinth, the sensory system in our inner ear which transmit information via the vestibulocochlear nerve to the cerebellum and to nuclei in the brainstem called the vestibular nuclei. The vestibular nuclei then pass

the information on to a variety of targets, including the cerebral cortex. We receive visual and the somatosensory signals that reach the long vagus nerve, one of the most important nerves in the body.



The vagus nerve system.
Image: autismcoach.com

Meridians are energy channels 'transporting' life energy (Chi/Qi) throughout the body. Blockage can lead to lack of energy supply to certain areas of the body, or a surplus of energy in other areas. The pattern of energy can be measured in ECG, EEG, and other technology. I surmise that Ariadne may symbolise the loving energy we give to others and the strong lifesaving connections of positive loving social relationships that provide resilience and a sense of purpose that can lead us out of our darkest moments.



The body's meridians.
Image: drhuong.com/12-meridians

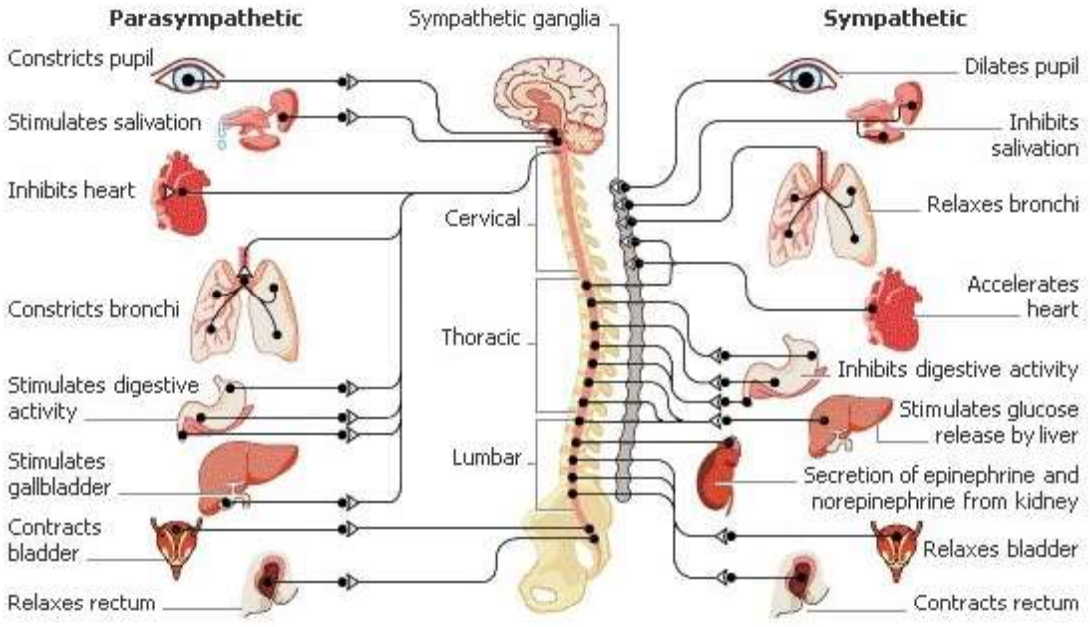
The vestibular system responds to movement, but we also receive input from multiple other systems including the visual and somatosensory system, which helps us recognize objects, discriminate textures and generate sensory-motor feedback. When participants are instructed to passively reflect on the labyrinth path the shift in gaze reduces the conflict between the need to accurately pursue visual stimulus so important for the perception of navigation and control of body and eye movements. The active chattering mind has less to talk about.

Proprioception, the ability to sense the position, location, orientation and movement of the body plays its parts. The transitions or turns involve an estimation of passive whole-body rotation. We may be conscious of our bodily sensations, movement and the feeling of our feet, our position in the space, gut feelings, and subtle changes in heart rate or breathing as we move. Proprioception or kinesthesia, is present in every muscle movement you have.[10]

Interoception is a similar concept. Just as there are receptors in your muscles and joints, there are also receptors inside your organs, including your skin. These receptors send information about the inside of your body to your brain. This is the process that helps you understand and feel what's going on inside your body, to feel emotions and sensations.

Impulses reach the vagus nerve, the vagabond thread, the two-way superhighway that info travels as it collects and transmits information from mind to muscle, from muscle to mind. The longest nerve of the autonomic nervous system and one of the most important nerves in the body, the vagus nerve helps to regulate many critical aspects of human physiology. The vagus nerve establishes connections and sends information about the state of the inner organs to the brain fibres. In Switzerland researchers found vagal tone is correlated with capacity to regulate stress responses and can be influenced by breathing. Meditation and yoga are likely to contribute to resilience and the mitigation of mood and anxiety symptoms. It is a very complex system, but a two-minute YouTube video about the vagus nerves had as much as I needed to know.[11]

A calm labyrinth walk may engage the calm parasympathetic nervous system, the part of the autonomic nervous system based between the brain and the lower part of the spinal cord that, in general, threads the molecules of emotion and inhibits or opposes the physiological effects of the alert sympathetic nervous system. The parasympathetic nervous system can slow the heart, constrict the pupils, dilate blood vessels and relax muscles, deepen our breathing and compose our thoughts.[12]



The parasympathetic and sympathetic nervous systems.
Image: autismcoach.com

Why do labyrinths reduce symptoms of anxiety and depression? The co-existence of vestibular disorders and anxiety may point to shared central pathways because patients with vestibular impairment have been observed to suffer from a high burden of psychiatric disease, particularly affective disorders such as anxiety and depression.

A report from Charing Cross Hospital, Imperial College London, demonstrates the wide-ranging influences of the vestibular system and self-motion perception upon behaviour which can impact upon mental health and body awareness.[13] As Lauren Artress has written, "The labyrinth literally reintroduces the experience of walking a clearly defined path. This reminds us that there is a path, a process that brings us to unity, to the centre of our beings. In the simple act of walking, the soul finds solace and peace."[14]

But there is more. Humans are social creatures. There are five cranial nerves that are joined in the search for connection with others through our eyes, ears, nose, mouth. These are the pathways you send and search for signs of welcome or signals of warning and are vital to maintaining strong community and social bonding. Through all our senses we may exchange social cues, stepping aside for others in the path.

It also seems that moving in time with others may result in us feeling better about ourselves compared to moving to our own rhythm. A report in *Frontiers in Psychology* has revealed that interpersonal synchrony has numerous affiliative and pro-social consequences, such as enhanced rapport, cooperation, and social-cognitive functioning. It appears that keeping in time with others may be a better means to feel good about ourselves than moving to our own beat, that coordination not only influences interpersonal outcomes, affiliation and cooperation but can also affect one's self-esteem.[15] Encouraging individuals to participate in labyrinth activities that involve moving in-time with others may be an effective tool to help improve positive cognitive and social connections.

Conclusion

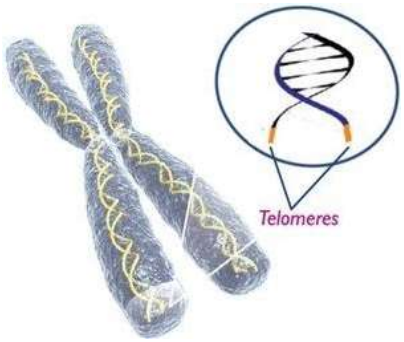
In Greek mythology the Minotaur is a mythical monster who dwelt at the centre of the Labyrinth. The creature, like our own inner demons that terrorise our psyche, had its genesis in a mismatch between human and the beast in us, the yin yang of our psyche, the Anima/Animus, the inner force that animates us. But as it is with our own troubling internal insatiable dragons, the Minotaur had no natural source of nourishment and for sustenance, devoured humans at the height of youth and beauty. We can become lost in the chaotic

maze of our mind and eaten up by our inner anxieties and troubling issues, our nerves a maze of anxieties. A host of psychiatrists and psychologists have developed weapons that may slay those inner monsters. These are well beyond the intent and scope of this article.

There is a lot more we can explore about what is physically and psychically going on inside our physical body-mind when we walk a labyrinth. I suggest that the network of nerves traversing our body and molecules of love and social bonding are carried to every cell in our body. It is love for each other that can provide us solutions to our problems and give meaning for our life and lead us out of the darkness of our souls to an improved quality of life, mental health, resilience and spiritual wellbeing.

As a footnote, I suspect psychologists and psychiatrists will be able to identify significant physical and psychological damage being done by the emotional impact of social isolation, masks and lockdowns and financial insecurity in the measurement of our telomeres.

We can now test for telomeres. A simple cheek swab, saliva collection or finger prick, offer the possibility of measuring the tips of chromosomes, called telomeres and testing for stress damage or restoration.[16] Elizabeth Blackburn received the Nobel Prize for this research in 2009.[17] I suspect the longest telomeres will be found in those who have resilience and a spiritual meaning to live.



Telomeres at the tip of each cell in our DNA.
Image: ellietalksaboutmedicine.blogspot.com

Further on I found an article from Clark University about the biochemical impacts of meditation which concluded that a newer field of research that has been gaining interest with mass spectrometry analysis is metabolomics, the study of small molecules, commonly known as metabolites, within cells, biofluids, tissues or organisms. Looking for a relationship with the 'labyrinth effect,' I was interested to see their research suggested that "many of the biochemical pathways that can be affected by meditation have also served as the biological targets of medical drugs developed to treat a variety of mental and physical symptoms."[18] It seems yet another research pathway is opening up.

We need labyrinths now more than ever. More people who can facilitate the walk and provide loving support will help us find a clear path out of the maze of disinformation and fear we now find devouring us.