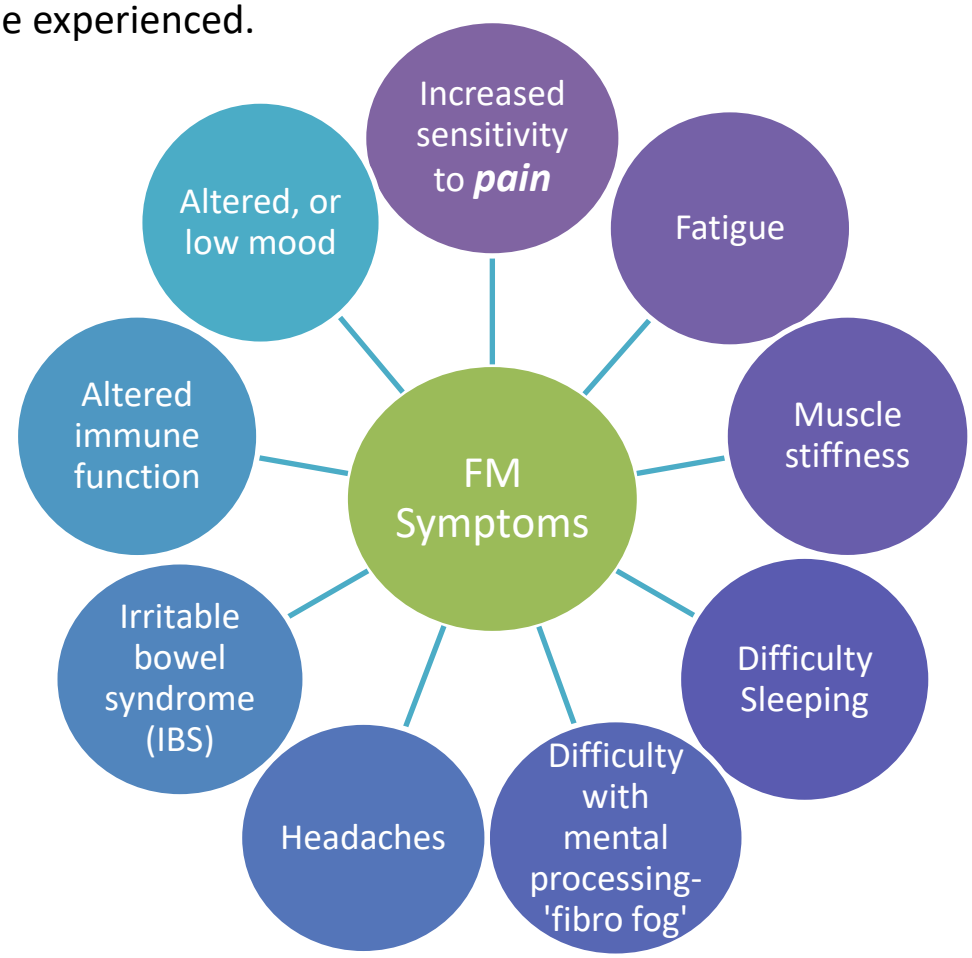
# Fibromyalgia Study guide

## What is Fibromyalgia?

- Fibromyalgia (FM) is NOT just one condition; it's a complex syndrome involving many different factors that can impact upon, and disrupt a person's daily life.
- Pain is the most commonly reported symptom, but other difficulties can be experienced.




## How does Fibromyalgia develop?

- The specific causes of FM are unknown. Many possible causes have been explored such as viral, hormonal , muscular, vascular, neurological, however no single cause explains the complexity of FM symptoms.
- Current thoughts use the following model to describe the development of FM.

Three P's model;

This describes the onset and maintenance of FM as a process. All 3 P's have an important role in the history of Fibromyalgia, and an understanding of this process can be valuable in moving forwards towards health improvements.

**Predisposing factors**:
female
genetics*
ACE's**

→

**Precipitating events**:
physical ; accident injury, surgery, illness.
emotional/mental; abuse, bereavement, financial stress, work pressures, shift work

→

**Perpetuating factors**:
unhealthy sleep
overdoing habits
poor nutrition
lack of self care
deconditioning
poorly managed stress

*Genes for managing neurotransmitters can sometimes be abnormal.
**ACE's; Adverse Childhood Experiences are stressful events occurring in childhood.

## What effect does Fibromyalgia have on the body?

Looking at the body as a biological machine tells us about only one aspect of health and illness, and may not always tell us what to do to improve our wellbeing.

*Imagine your washing machine starts to wobble and shake and move across the kitchen floor every time it is used. An engineer, on inspecting your machine may tell you the **cause of the problem** is worn springs. However the faulty springs may not be the whole story... To understand why the springs are worn we might want to watch how members of the family load the machine. If we witness the machine being regularly overloaded, we now have a **better understanding of why** the problem has developed. Repairing the springs will help us in the short term. But looking beyond the mechanical faults, and understanding the 'why' indicates a better longer term solution.*

Therefore knowing about individual changes in the 'mechanics' of your body may not give a full account of a problem such as FM. This does not mean however that FM is completely invisible. There are *changes in biology* which have been identified in many people with FM. This information can help us to make sense of the process and can help us plan for more effective self-care and symptom management.

## Are there effects on the muscular system?

Biopsy studies do not show clear evidence of change in muscle tissue, however some of the following changes have been seen in some people with FM;

- *Altered mitochondria*. Mitochondria are the energy factories within our cells. In FM the mitochondria can be abnormal or low in numbers. When mitochondria cannot fulfil their role, less sugar is burned resulting in weight gain. Inefficient mitochondria lead to reduced energy production, fatigue and muscle pain.

- *Lactic acid* build up. Mitchondria package energy chemically as a substance called ATP. Low levels of ATP have been seen in people with FM. If the body cannot access energy from ATP, it will try to create energy through its glucose stores, which creates Lactic acid. Lactic acid build up causes muscle pain, soreness, and interferes with oxygen levels in the tissues.

- *Trigger points*. Tight, sensitive areas within muscles are often found in places which are working too hard, such as shoulders, back, and hips. Certain muscles will work too hard, and tense up when we are in pain, or in response to another stressor. These overworked areas of muscle can also be found to have reduced levels of oxygen, which can lead to soft tissue pain.

# Are there changes in the nervous system?

The nervous system is separated into 2 parts;

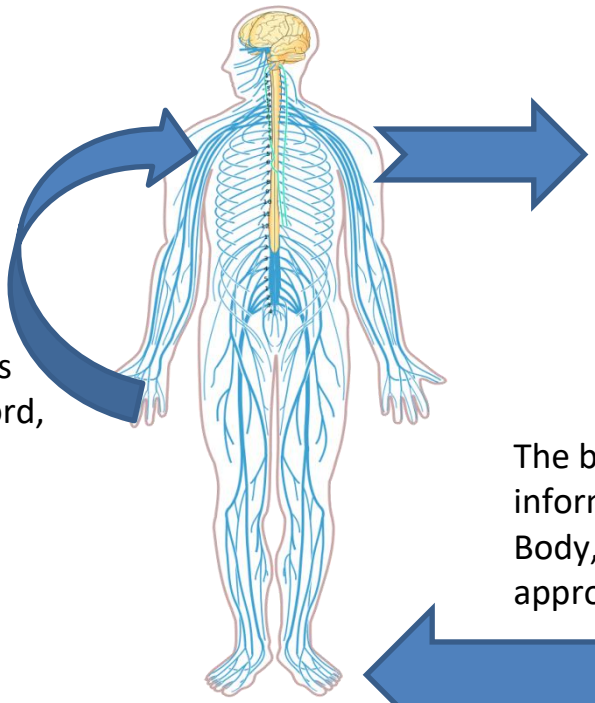
- The *Central Nervous System* (CNS) which includes the brain and the nerves of the spinal cord.

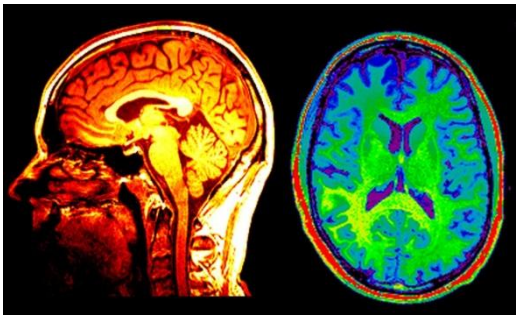
- The *Peripheral Nervous System* (PNS), which includes the long nerves that transmit messages between every part of your body and the spinal cord. The peripheral nerves are further separated into;

    - The *Somatic nerves*; those you can influence at will e.g. muscles which coordinate your muscles to make you walk.

    - The *Autonomic* (automatic) *nerves*; those that run basic functions such as breathing, heart rate. These Autonomic nerves are further separated into;
        - Sympathetic system 'fight and flight' nerves.
        - Parasympathetic system 'rest and digest, feed and breed' and 'freeze' nerves.

The ***PNS*** detects, and transmits information from the body. This information travels through peripheral nerves and the spinal cord, and on to the brain.





The brain and ***CNS*** interpret the information, and instruct the Body, via the PNS, to respond appropriately.

- Central Nervous System

Modern imaging of the brain using MRI and *f*MRI has shown differences in those with FM within what's called – 'the neural pain matrix'.
These changes can help to explain the difficulty of pain control, and the intolerance of stimuli such as; light sound, touch, taste etc. However what is not known is whether these changes occur as a result of FM, or cause FM symptoms to develop.

- ***Increased connections between areas of the brain*** which run our automatic functions (automatic pilot) whilst at rest, and the insula (area of the brain which provides emotional meanings to how we feel physically in our body), can explain how we might feel distress in our bodies in the absence of physical disease, or injury.

- ***Decreased amounts of 'grey matter'*** (nerve cell bodies) in the areas of brain which can modulate/control the pain experience such as the 'thalamus' and 'anterior cingulate'. This can explain why we have less processing power to control pain.

- ***Decreased activation and connections with the body map***. Painful, or other unpleasant stimulation should activate the area of the brain which holds a map of the body, the 'Homunculus'. However in FM, this area is less active, meaning we cannot locate and address the pain, but rather it spreads everywhere and is poorly controlled. Instead the area which is most active is the limbic region of the brain (emotional region).

- Peripheral Nervous System

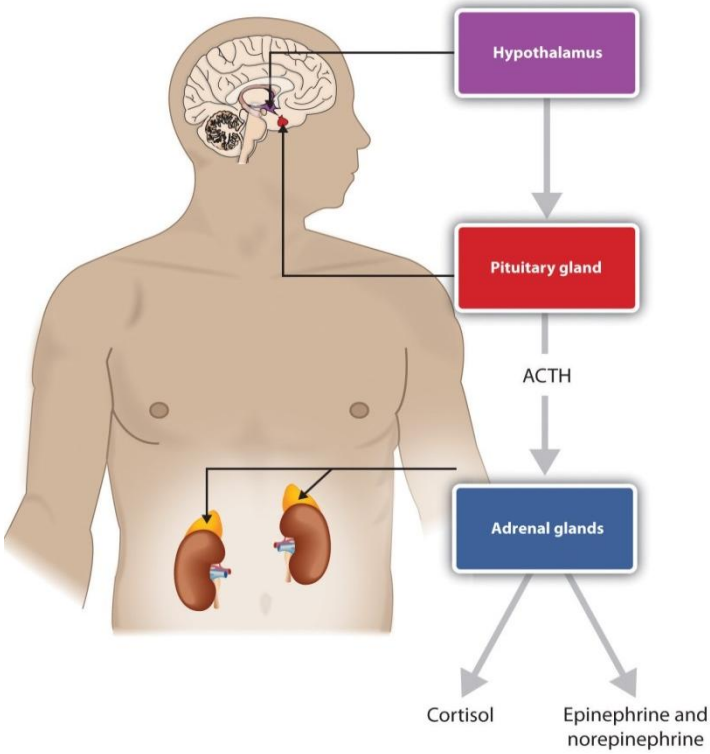
The balance of the autonomic nerves (ANS) is important for healthy responses to the environment in which we live. Being able to adapt appropriately to different circumstances, and then return to a restful


state is managed by the ANS.
In those with FM, the ANS can be out of balance.
The Sympathetic system (SNS) can be hyperactive. This means the body is working whilst under the influence of stress responses (fight or flight). This is a very exhausting state to maintain, and prevents the body from being able to fully rest, or relax.
Sometimes the Parasympathetic system (PNS) can be hyperactive. This means the body is working whilst under the influence of a freeze response, and may suffer with feelings of faintness, low blood pressure, fatigue, and mood issues.
For many people, the problem is an inability to move easily and appropriately between the Sympathetic and Parasympathetic states.

## Are there changes in the Endocrine (hormone) system and neurotransmitters?

Hormones and neurotransmitters are two different types of chemicals that carry signals from one part of the body to another. They are involved in coordinating complex processes, and can influence our thoughts and feelings, and how we function.

Hormones (e.g. Melatonin, Cortisol, Epinephrine) are produced in endocrine glands, and travel through the circulatory system to distant regions within the body.



Neurotransmitters (e.g. dopamine, serotonin, Substance P) are produced by the brain and work on local nerves to transmit messages though the nervous system.

- *Cortisol* is an important stress hormone, as it helps the body to respond appropriately to stress (physical or mental). The body uses the 'Hypothalamic Pituitary Adrenal Axis', to monitor and manage the need for cortisol. This system is thought to operate poorly in people with FM, resulting in a person being less able to respond well to stress.

- *Substance P* is an important neurotransmitter. It is released when our body detects injury or threat, and is part of our defensive biology to assist healing. It is involved therefore in the perception of pain, and those with FM are often found to have much greater amounts (approx. 3 times more, compared to those without FM) of Substance P in the brain and CNS. With more substance P comes a greater experience of pain.

- *Serotonin and Dopamine* are found within the nervous system. One of their roles is to inhibit, or 'dampen down', incoming transmission of 'noxious' messages – in other words, they reduce our experience of pain. In those with FM, these neurotransmitters are found to be reduced.

- *Corticotropin-releasing hormone (CRH)* released by the HPA axis is found in higher levels in FM. It stimulates our sympathetic nervous system, and in studies is found to be linked to the severity of pain in FM.

# Are there changes in the immune system?

The nervous & immune systems work together to detect and respond to any potential threat to your body's health and wellbeing. The immune systems' chemical reactions involve a release of 'cytokines', which signal the body to move into 'Sickness behaviours'.

Sickness behaviours are those symptoms we recognize as being ill; i.e. having no appetite, feeling lethargic and achey, being intolerant to environmental stimulation (noise and light), not being able to string a sentence together, sensitive skin. Overall, sickness behaviours leave us with little interest in the world around us. These behaviours are necessary to make us **STOP**, rest up, redeploy our resources towards healing, and hopefully get well.

- ***In FM, larger amounts of cytokines can be found***, leading to increased severity of sickness behaviours i.e. the symptoms of feeling ill. Whilst this system is designed to protect us and keep us safe and well; without identifiable infection or disease, it can create a prolonged state of 'sickness' whilst causing us to **STOP.**


- Remember the ***mitochondria*** … Supposed to be the powerhouse of all our cells, manufacturing energy for our bodies? Evidence has shown that in times of overwhelming stress our mitochondria cease to produce energy, instead they join in with our immune response, signaling for extra help!


# What does all this biology tell us?

OR

Although it may feel as though our body has been affected by an illness or ***disease*** which has ***caused*** our ***FM*** symptoms…

Some researchers have suggested the idea that the human body develops a set of skills through life, including the skills of dealing with challenges (physical, mental, or emotional). Biologically speaking our body will use these 'defensive strategies';-

- Muscular system; fight, flight or freeze.
- Nervous system; fight, flight or freeze.
- Brain reprogramming; identify and respond to current challenge based on past experience.
- Hormonal and Endocrine 'upregulation'; increased ability to transmit messages of threat or challenge.

Our body's own ***self defensive systems***, when faced with new challenges or threats, may in fact ***cause*** our ***'dis – ease'***, which may be experienced as the complex syndrome that is Fibromyalgia.

# Is there a further role for the brain?

# Why is Trauma often mentioned?

When we consider many of the Biological changes described here in these pages, the common theme is PROTECTION and SURVIVAL. The biology of the body is there to, detect and respond to *any* threat (sometimes from within our own body!) to our survival.

This is an instinctive process which does not require our conscious thinking brain. Whilst we are born with some basic 'biological equipment' or 'hardware' in order to instinctively help us survive; we further develop the use of these systems, and develop 'software programs' or behavioural patterns throughout our life.

It can therefore be said that:

***"Our Biography becomes our Biology"*** ***(Caroline Myss)***

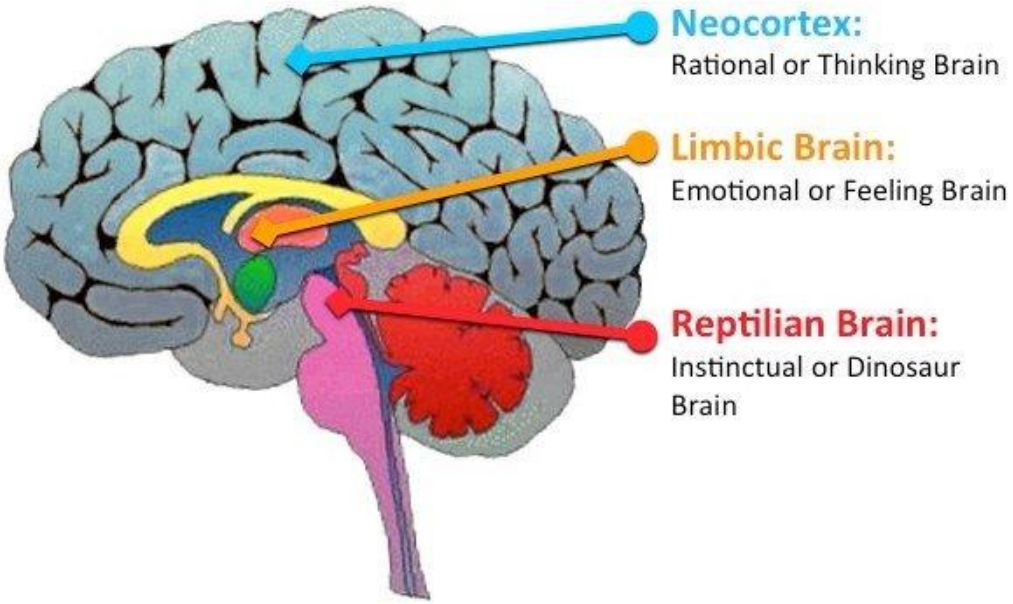
## *What do we mean by Trauma?*

Any event or situation we meet in life which overwhelms our ability to cope, can be called '*stressful*', to be classified as '*Traumatic*' these experiences are perceived as a risk to our survival/something which overwhelms our abilities to respond (i.e we feel helpless). These traumas can be single episodes such as; an accident, or surgery, or ongoing situations such as; abuse, illness, or neglect. If these traumatic situations occur during our childhood they can have a more profound effect on our developing biological systems.

Research suggests more than 90% of adults with FM have a history of some trauma in their life; these powerful statistics confirm what we know about our biological development.

*Biology of Trauma*

Scientists have been able to map the different regions of the brain to illustrate how we organise our response to threat or trauma.




When faced with a threatening situation the brain's lower regions 'Reptilian brain' will respond by generating 'fight, flight' or 'freeze' messages to the body. If the threat is deemed escape-able, 'fight or flight' may be selected, if the threat is deemed in-escape-able the 'freeze' or 'shut down' option will be selected. These choices are instinctive, and powerful and immediately impact upon all bodily systems.

A threatening situation may be something we witness, or sense, in our external environment such as a threatening person. A threatening situation may also be generated from our inner

experience, such as sleep deprivation, pain, and even our own thoughts.

If we have experienced previous trauma, the middle region of the brain, known as the 'Limbic' area, can hold onto negative emotional memories. These memories, and emotions such as fear, anger, and hopelessness, will be held by the brain as a record of our past. This record acts like a map of the world around us, to help us navigate through each day of our life. Remembering where there are threats can help us to avoid the same dangers in the future.

Strong connections can be created between the 2 lowermost regions of the brain, and at any time the emotional 'Limbic' centre is triggered into action, the instinctive 'reptilian' centre will activate the same physical and behavioural pattern of fight, flight or freeze.

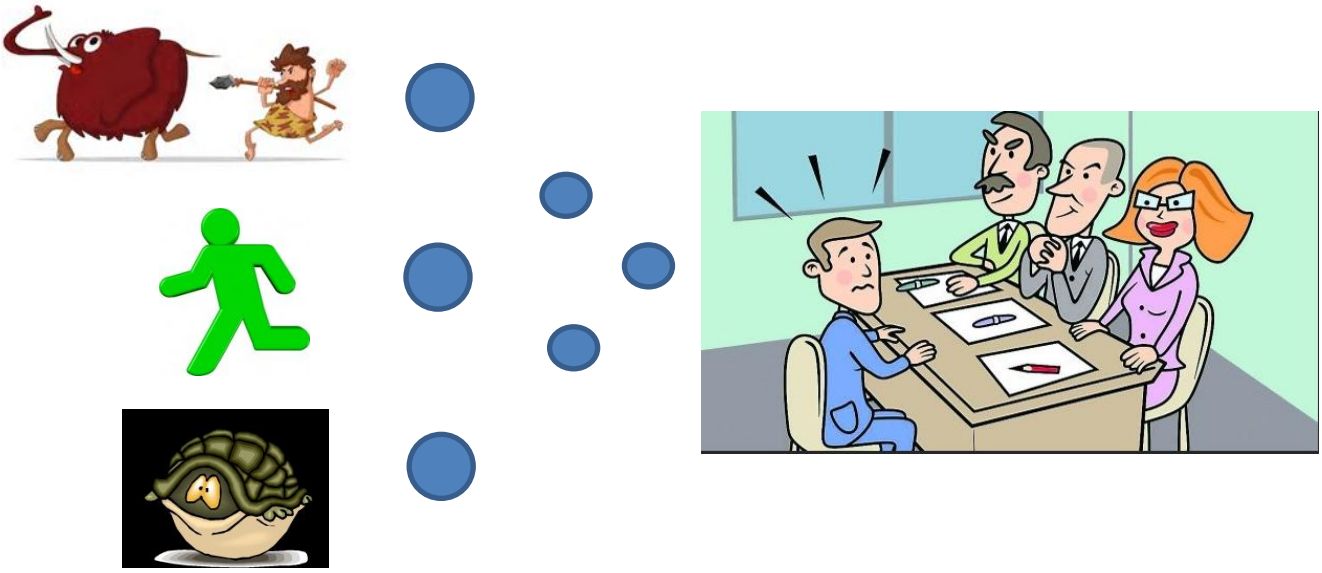
Finally, the 'new brain' or 'Neocortex,' which is the most developed region of the brain, can control these lower regions. This region comes under our conscious control, and we use our rational thoughts to influence the lower regions.

*What does it look like when these 3 areas work together well?*

A person who is waiting to go in for a job interview, for a job they truly desire, may notice their heart beat increasing. As their heart beat increases their Reptilian brain notices the increase, and fears that a dangerous situation is occurring and starts to generate messages through the body to fight, flee or freeze.

At the same time, the Limbic centre is experiencing excitement and hope, considering how great life will be with an increased salary and a wonderful new job. Through excitement, the person's heart rate increases further.

Ultimately, the person's Neocortex, takes hold of the situation, and is able to downregulate the reptilian brain's physical responses. After all fighting, running or freezing is unlikely to get the job!



*What does it look like when these 3 areas work together with FM?*

If the interviewee experienced a traumatic childhood, memories of this period in their life will be firmly held in the brain. In fact these memories can be so strongly connected that the neocortex can have a reduced level of influence.

If they walk into their interview to see an interviewer who resembles a person who previously was a threat in their childhood, the reptilian brain will instinctively create a strong response to fight flee or freeze. The Limbic centre will be aware of a strong emotion of fear and negativity, these powerful emotions and reactions may not be controlled by the neocortex. Past experiences will have proven it's better to be 'safe than sorry', and the survival response wins out. With survival responses, comes increased pain and fatigue as the body becomes highly sensitive to its surroundings, and uses large amounts of energy to be prepared for action. The higher brain

regions switch off, to allow the lower survival instincts, to make the person safe.

The person is unable to perform well in the interview as they feel the effects of a FM flare up, and struggle to remember what they wanted to say.

*Is there a way to turn a traumatic history around?*

Post traumatic growth (PTG) is something which is not often talked about, but evidence shows us it occurs in approximately 50% of those who have experienced a traumatic experience. If post traumatic growth is shown to be ***possible for any of us***, the invitation here is to find the key ingredients to providing ***post traumatic growth for all*** those who now experience FM.

"We have to be mindful that trauma impacts us all differently, and not to suppress or ignore our suffering in a naive pursuit of optimism. By minimizing our trauma and its impact, we may find ourselves not being able to healthily express our negative emotions and reduce our chance of benefiting from PTG by reducing the experience." *(L. Chambers. Environmental psychologist)*

Having an honest enquiry about the antecedents of your health challenges can identify if trauma has been involved. By building this into your framework of understanding you have the opportunity to reflect, process, and express the situations you have been in and the resultant effects they may have had on your whole person; and so begins the opportunity to heal.

**If you feel this applies to you**, you may need individual support to help you address your own personal experiences, to start building towards your post traumatic growth.