

# Gut Health – Kelda White

[www.keldawhite.co.uk](http://www.keldawhite.co.uk)

Week 2: The vagus nerve

- What it is.
- Why it is important.
- How to look after it.

Vagus nerve is the fastest and most important route from the gut to the brain.

- Runs through the diaphragm, between the lungs and the heart, up the oesophagus through neck of the brain. Has several branches. All the way to the reproductive system.
- Vagus from the Latin for wanderer. Vagrant.
- It establishes one of the connections between the brain and the gastrointestinal tract and sends information about the state of the inner organs (gut, liver, heart, lungs) to the brain via afferent fibres.
- Gut has the largest surface towards the outer world (we are a tube) so is an important sensory organ.
- Enteric nervous system communicates with vagus nerve but functions independently.

Signals from the gut reach different part of the brain but not everywhere – for example, not visual cortex or we would have visual images associated with our digestive system.

- Humans can be made to feel comfortable or anxious by stimulating the vagus nerve at various frequencies. 2010: EU approved a treatment that used nerve stimulation to relieve depressive disorders.
- Brain heavily insulated in protective bony skull, surrounded by thick membrane and all blood is filtered before it reaches the brain. Therefore needs information from other parts of the body.
- Information is received by conscious mind and allows it to formulate a response to our environment.
- Brain and gut originate as the same clump of cells and continue to communicate throughout our lives.

Vagus nerve is main contributor to the parasympathetic nervous system.

- Sympathetic and parasympathetic nervous system regulate vegetive functions by operating in opposition.
  - Parasympathetic (rest and repair state): blood vessels dilate, salivary/glandular secretions activate, bowel motility and urine production increases. Reproductive organs function correctly.
  - Sympathetic (fight or flight, linked to adrenal response) causes constriction of blood vessels, dilation of bronchioles, raised heart rate, raised blood pressure, perspiration, constriction of intestinal and urinary sphincters, reduced blood flow to the gut and reduced intestinal activity.

Being in stress state long-term leads to blood vessel damage, high blood pressure, digestive problems, sexual issues.

- Increased cortisol levels as part of stress response can lead to blood sugar imbalance, acne, obesity etc.
- Persistent stress: overstimulation, deadlines, driving, watching scary films, mulling over past offences, strong emotions, expecting the same performance in the winter as the summer etc causes long term damage.
- Return to relaxed state (one governed by the parasympathetic) signalled by production of other hormones (acetylcholine and GABA). Need to be in this state most of the time to allow our body to function normally.

Vagal nerve function referred to as 'tone'. Symptoms of loss of tone are diverse but include:

- Earache without obvious cause, tinnitus, itching.
- Tension in neck or tightness/lump sensation in throat with difficulty swallowing.
- Pressure in chest Tachycardia, palpitations, or skipped beats. Breathlessness.
- A sensation of tightness or a lump in the throat and difficulty swallowing
- Stuttering, vague thoughts.
- Tingling or numbness in extremities (Raynauds).
- Pain, churning or sensations in abdomen. Nausea.
- Weakness, faintness, dizziness. Visual disturbances.
- Temperature extremes and sweating.
- Anxiety, trembling.
- Frequent urination. Pronounced thirst for cold water.

2013 first study on human brain and intestinal care published. Researchers had seen effects in mice but assumed no impact on humans.

- After four weeks of taking a cocktail of bacteria, areas for processing emotion and pain in the brain were significantly altered.

Thalamus monitors what information reaches the brain. Would not generally report a repeated stimulus (eg: eyes reporting that the door is blue if it is always blue) or something that is not important.

- Most digestive processes ignored. Big changes reported: alcohol, pathogenic bacteria, trapped wind. Also 'good' news: satiety and sleepiness after a big meal.
- Irritated gut link to irritate brain: shows on scans. Small balloon inflated inside volunteers' intestines: healthy volunteers showed no change in brain activity. Those with irritated guts showed activity in part of the brain associated with unpleasant emotions. Patients felt uneasy although nothing untoward had happened.
- IBS sufferers have bloated, gurgling, diarrhoea and constipation. Also above average incidence of anxiety and depression. Also Crohns and ulcerative colitis. Cause or effect?
- Persistent inflammations, imbalanced gut bacteria or food intolerances can be the cause. Still often dismissed as no visible gut damage.

Stress one of the most important stimuli which is transmitted between brain and gut.

- If brain has an issue (pressure or anger), it wants to resolve it. Needs energy which it takes mainly from the gut. Gut informed of situation via sympathetic nerve fibres and has to defer to the brain during what it considers to be an emergency situation: slows down digestive process by producing less mucus and reducing blood supply. Diarrhoea and emotional vomiting are gut's attempt to rid itself of food to save energy for the brain. Cannot go on long-term without effects.
- If 'emergency' situation continues for a long time, the brain begins to make too many requests of the gut which then has to send unpleasant signals back to the brain to highlight the distress: fatigue, loss of appetite, general malaise, diarrhoea.
- Immune cells in gut wall secrete large amounts of signal substances that make the gut brain more sensitive. Also change balance of bacteria due to changed living environment.

Increasing your vagal tone activates the parasympathetic nervous system, and having higher vagal tone means that your body can relax faster after stress.

- In 2010, researchers discovered a positive feedback loop between high vagal tone, positive emotions, and good physical health. will improve, and vice versa.
- Vagal tone passed from mother to child – mothers who are depressed, anxious or angry during pregnancy have lower vagal activity. Their children have low vagal activity and lower dopamine and serotonin levels.
- Can measure vagal tone by monitoring heart rate, breathing rate and how you feel.
- Heart rate variability: variance in time between the beats of your heart. Eg: may vary between 0.9 seconds and 1.1 seconds if beats 60 per minute. The greater this variability is, the more "ready" your body is to respond.

### ***Supporting the Vagus Nerve:***

*Cold exposure:*

- Often we are not exposed to enough thermal range in everyday life due to climate controlled environments.
- Blood moves to internal organs to keep them warm and protect them – heart and lungs work harder. This improves circulation and allows toxins to be circulated out of the body.
- Also brings us back into our body: stops us thinking.
- Connects whole nervous system (whole body stimulated) and stimulates production of endorphins and 'feel' good hormones afterwards which put us in parasympathetic state.
- 30 seconds of cold shower at the end; splashing face with water. Applying cold compresses.

### *Deep, slow breathing.*

- Reduces anxiety. Usual breath rate is 10-14 per minute.
- Reduce to 6 breaths per minute, breathing deeply from diaphragm and making exhalation slower.
- Alternate nostril breathing. Breathing through nostrils rather than mouth.

### *Meditation*

- Reduces stress response in the moment and also long term.
- Also being quiet and in quiet environments.

### *Being in nature:*

- By 2050, over 65% half of the worlds population is going to be living in cities. Already 55%.
- Shinrin-yoku is Japanese forest bathing. Using all five senses to tune into the forest. Whole host of benefits includes lowered blood pressure, reduced stress, lowered heart rate, muscle relaxation, improved short-term memory, better emotional state.
- Plants produce natural phtoncides which boost immune function, particularly with regard to cancer fighting cells.
- Green is known to be calming (green room behind stages), peaceful, harmonious, soothes digestion, resonates with the heart, love and nurturing.
- Healing rates faster: 1984 study of cholecystectomy patients showed they recovered faster even with a view of trees from their hospital beds.
- Exposing skin to sunlight.

### *Positive behaviours*

- Saying thank you, smiling, forgiveness, being with people who are nurturing, listening to uplifting music, being creative, laughing, being grateful, complimenting others.

### *Singing, humming, chanting, gargling*

- Vagus nerve connected to vocal cords and muscles in back of throat.
- Anything that stimulates this area increases vagus nerve health.
- Energetically the throat area and the reproductive areas are linked. For women, cervical stimulation tones vagus nerve as it runs through.

### *Diet*

- Probiotics: lactobacillus rhamnosus reduced stress hormones, depression and anxiety behaviour in animals. If vagus nerve severed, no changes. Noted.
- Good diet which nourishes the gut.
- Omega 3 fatty acids increase vasal activity and parasympathetic dominance.
- Bitters work on the heart, the gut brain, the liver and on the nervous system.

### *Exercise*

- Supports brain's mitochondria (energy generators). Stimulates vagus nerve.
- Weights, walking, high intensity exercise if possible but anything within capabilities.

### *Massage, reflexology, touch*

- Stimulates vagus nerve and decreased stress response.
- Touch is soothing. Hugs and touch release oxytoxin.
- Massaging carotid sinus near right side of throat stimulates vagus nerve and reduces seizures.