

Why is the Inflamed Mind relevant to neurological illness:

exploring the Body↔Mind connection

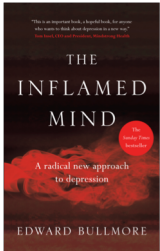
Dr Neil Bindemann
Executive Director



















Available for £10 from www.innervate.co.uk

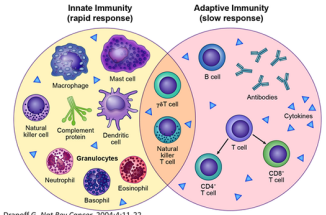


INFLAMMATION







IMMUNE SYSTEM









Dranoff G. Nat Rev Cancer. 2004;4:11-22.



Dysfunctional Immune System

- Aging
- Mental Stress
- Unhealthy lifestyles



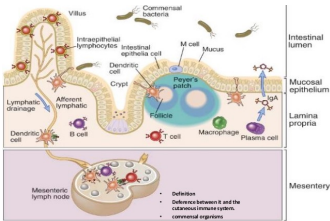
Consequences of immune dysfunction

- Cancer
- Infectious diseases
- Allergies
- Neurological conditions

GUT IMMUNE SYSTEM

Major organ:
Represents almost
70% of the entire
immune system

About 80% of
plasma cells reside
in the GALT







Migraine:
associated with gastrointestinal disorders:

Van Hemert et al, Front. Neurol., 21 November 2014





CGRP

Calcitonin Gene Related Peptide







Epilepsy

- Intestinal Microbiota as an Alternative Therapeutic Target for Epilepsy
- Ketogenic diet poses a significant effect on imbalanced gut microbiota in infants with refractory epilepsy
- Fecal microbiota transplantation cured epilepsy in a case of Crohn's disease







Multiple Sclerosis





- An auto-immune condition
- More recent treatments – target the immune system
- Dietary link – Vitamin D?
- The Microbiome and MS: The Influence of the microbiota on MS risk and progression – symposium at ACTRIMS (Americas Committee for Treatment and Research in Multiple Sclerosis)



Gut ↔ brain connection
VAGAL NERVE
Vagal Nerve Stimulation (VNS)
Epilepsy Depression Parkinson's Arthritis







GUT ↔ MICROBIOME ↔ BRAIN





Neurological disease and the Gut Microbiome

- Multiple Sclerosis – largely animal studies using EAE
- Parkinson's – differences between the microbiota in established PD compared to controls
- Alzheimer's – Poor dental status link and antibodies to bacteria
- Psychiatric disorders







STRESS







Traumatic stress influences a gene associated with inflammation:
AIM2 – which produces CRP

Miller et al, 2018 Journal of Brain, Behavior, and Immunity,



STRESS
↓
GUT↔MICROBIOME↔BRAIN

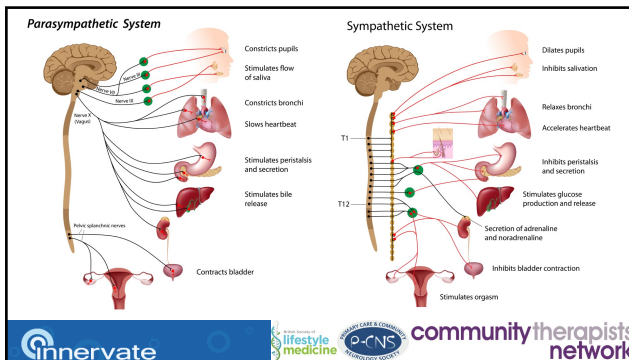


Stress and the microbiome

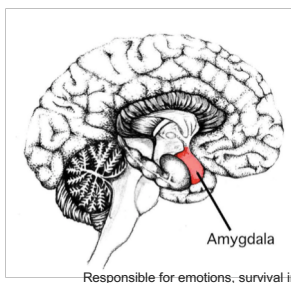
- Stressors alter the balance of gut bacteria and circulating cytokines
- Breaking down the barriers: the gut microbiome, intestinal permeability and stress-related psychiatric disorders
 - Similarities between the intestinal, placental and BBB
 - Bidirectional signaling between the gut and the brain is regulated at neural, endocrine and immune levels – under the influence of the gut microbiota
 - Stress can impact on the developmental trajectory of the intestinal barrier
- Is there a bidirectional relationship?



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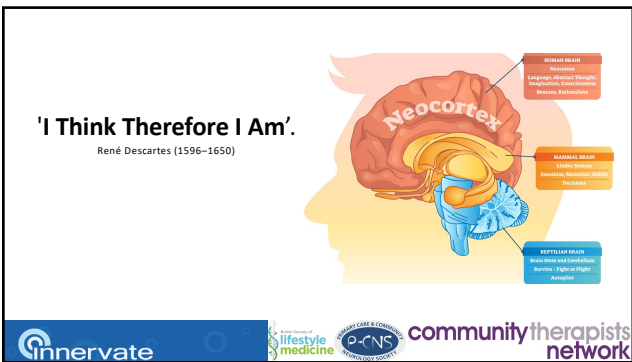


Responsible for emotions, survival instincts, and memory.



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Harnessing Stress



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lifestyle
medicine

PCNS
PAIN CLINICAL NERVOUS SYSTEM

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How we approach stress

- A tendency to always expect the worst, linked to a 25% higher risk of dying before the age of 65¹
- Ruminating on a stressful incident increases CRP (a marker for inflammation)²

¹ Mayo Clinic Proceedings 2000 Feb;75(2):133-4

² Study presented at annual meeting of the American Psychosomatic Society in Miami, Fla, 2013

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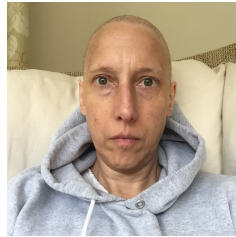
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How we approach stress

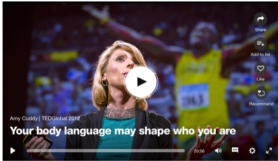
- 43% increase risk of dying in people who experienced “a lot of stress”, **but only true in people who believe that stress is harmful**
- Mind over matter: reappraising stress – induced arousal improved cardiovascular and cognitive responses to stress

Keller et al, 2012, Health Psychol
Jamieson et al, 2012, J Exp Psychol Gen
Poulin et al, 2013, Am J Public Health









Body language affects how others see us. It may also change how we see ourselves.

"power posing" -- standing in a posture of confidence, even when we don't feel confident -- can boost feelings of confidence, and might have an impact on our chances for success.



The expression of genes in an organism can be influenced by the environment, including the external world in which the organism is located or develops, as well as the organism's internal world, which includes such factors as its hormones and metabolism.

Ingrid Lobo, Ph.D. (2008) Environmental influences on gene expression. *Nature Education* 1(1):39








What we eat & the immune system







Impact of foods

- Probiotics
- Prebiotics
- Polysaccharides
- Vitamins
- Minerals
- Fatty Acids
- Peptides
- Amino Acids and polyphenols

Immune response












Brassicas

- Enhance natural killer activity and IFN- γ production in mice
 - Knock on effects of this on other elements of the immune system e.g. macrophages activated by IFN - γ^2

Flavanoids and polyphenols

- Quercetin and related polyphenols enhance secretion of anti-inflammatory substances by *Bifidobacterium adolescentis*¹





Living *through* & learning from a
brain tumour experience



Thank you for listening

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