FEATURE ARTICLES

The links between mental health & acidity

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Mental health disorders are a growing burden in Australia and worldwide, many beginning in childhood or early adolescence. Growing evidence indicates that besides psychological and environmental factors, the diet and pH balance are significant factors.

The effects of high dietary acid load on mental heath

Studies indicate several diets have an inverse relationship with depressive symptoms, including Mediterranean and vegetarian diets, both of which are somewhat anti-inflammatory. This may be the case; however, closer inspection of these diets reveals that they also have a low dietary acid load and are more alkaline due to the high vegetable intake and moderate animal protein.

In a population-based study published in 2018 on over 1000 children and adolescents, it was found that those with a higher dietary acid load (more acid than alkaline) had more emotional problems and a higher incidence of depressive symptoms.

An increase in dietary acid load in children was associated with:

- **33% higher risk of emotional problems, fears and worries, a downhearted mood, and low self-confidence.**
- **22% higher risk of hyperactivity, poor attention, and impulse control issues.**

Bühlmeier J et al.(2018). Dietary Acid Load and Mental Health Outcomes in Children and Adolescents: Results from the GINIplus and LISA Birth Cohort Studies. Nutrients. May 8;10(5).

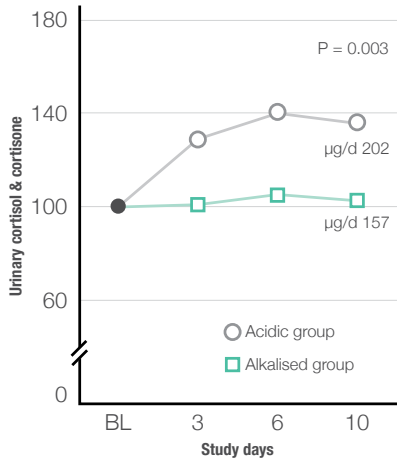
High dietary acid load leads to increases in glucocorticoids

The authors of this 2018 study suggest interesting biological mechanisms may have led to such startling results:

1. **Systemic acid-base imbalance may change blood–brain transport and glutamate turnover in the brain; thereby, challenging complex neurological processes.**
2. **A high dietary acid load leads to increases in stress hormone activity, such as glucocorticoids (GC).**

Elevated GC secretion in children and adolescents is associated with a variety of somatic symptoms, including low mood, executive function and problem solving.

This effect on GC secretion is also seen in adults. In a 2016 crossover interventional study, eight healthy men were given an acidic diet for ten days, induced by high levels of sodium chloride. One group was also given an alkaliser (potassium bicarbonate) to neutralise the dietary acidity. Both groups had their urinary free cortisol and urinary free cortisone measured. The study highlighted a significant elevation of glucocorticoids in the acidic group, which is consistent with other current scientific literature.



Buehlmeier, J & R et al. (2015). Glucocorticoid activity and metabolism with NaCl-induced low-grade metabolic acidosis and oral alkalization: results of two randomized controlled trials. Endocrine. 52.

Urinary glucocorticoids were elevated in adults who had a high dietary acid-load.

pH imbalance plays a role in Alzheimer's disease, bi-polar and schizophrenia

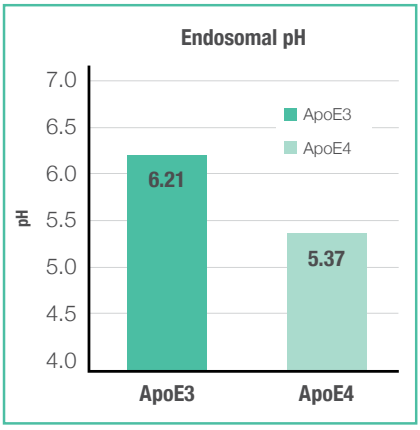
Research has historically shown low pH is associated with several somatic disorders; however, it is now known that a lower pH may exert a negative effect on brain function and plays a key role in the pathogenesis of psychiatric disorders.

Lower pH may play a key role in the pathogenesis of psychiatric disorders.

A recent meta-analysis published in 2018 revealed that brain pH was significantly more acidic in those with bipolar disorder and schizophrenia than in control participants. They also had significantly higher lactate levels in the brain.

New evidence also points to pH imbalance in brain astrocytes as an underlying cause of Alzheimer's disease (AD).

A recent study found that endosome pH was significantly more acidic in ApoE4 astrocytes. Endosomes are components of brain cells which act like nutrient and chemical cargo shuttles. They help clear beta amyloid proteins from the spaces between neurons. When this process goes awry, beta-amyloid proteins pile up around the neurons forming the characteristic 'plaques', which leads to nerve cell degeneration, vascular dementia and AD.



Additionally, the authors proposed that the ApoE4 down-regulated acid-alkaline pumps within the endosome, reducing the clearance of acidic protons from the cell.

Perhaps even more interesting was that they were able to reverse this process by alkalising the endosomal pH in an experimental model.

An acidic pH interferes with the ability to clear proteins from brain cells; however, alkalisation may reverse this process.

In addition to the current and historical evidence highlighting the importance of pH balance in our diet, new and emerging research is now clearly showing the impact of acidity on cognitive function, the brain and mental health. Increasing alkalising minerals in the form of food or supplementation may be an important strategy to support brain function.

REFERENCES AVAILABLE UPON REQUEST