

## Nutritional Strategies to Cool Down Neuro-Inflammation in PANDAS

by Lucinda Miller, Clinical Lead at NatureDoc and author of The Good Stuff

Parents who have turned to the Children's e-Hospital for medical support when their child presents with symptoms of PANDAS and other neurological autoimmune inflammatory conditions generally discover that first line medical therapies and protocols, including antibiotics and non-steroidal anti-inflammatories, can make a huge difference to these kids, and very often with these simple interventions the child can get back to normal life and school quite quickly.

But they are often left wondering how they can avoid their children getting back into the same inflammatory rut as before. Many kids unfortunately regress back to square one when they catch another virus or bacterial infection - and this is known as a PANDAS flare. Streptococcal infections are rife in school settings, as are a plethora of other bacterial and viral infections that can trigger a misdirected autoimmune response to the infection, and the kids are still vulnerable to flares whilst their body is still in autoimmune inflammatory mode.

We now know that chronic bodily inflammation is heavily influenced by what we eat, our environment, and how we live in it. This means some of our modern-day habits and lifestyle may be driving this inflammation and autoimmunity crisis. So, here are some ideas for lifestyle changes that can potentially reduce the chance of inflammation.

### De-Stress

We are now becoming more aware of how stress can affect the development of inflammation. Adverse childhood events including birth trauma, bullying and family break ups can be part of the development of inflammatory conditions. Too many expectations for children to succeed academically and packing in too many after-school activities can also be part of the inflammation picture. This is partly why yoga, meditation and mindfulness are becoming increasingly popular, even with kids. A warm bath with added lavender oil or Epsom salts can help kids to de-stress.

### Increase Sleep

Getting enough good quality sleep also plays a very important role in keeping inflammation in check, so simple things like getting a child to bed on time with a nice and calming bed routine can be important. Try a warm milky drink with turmeric honey and cinnamon, or some oats like oatcakes or porridge before bed. Morning fresh air and sunshine and stopping screen time 60-90 minutes before bed helps to reset the circadian rhythm and in turn can reduce inflammation.

### Optimise Nutrients

Enough vitamin C, D, zinc and magnesium as well as other trace nutrients are important for keeping inflammation in check, and this is why a nutritious diet and sunshine is so important for our wellbeing. Drinking enough water is also yet another important factor and even being slightly dehydrated can exacerbate inflammation.

### Vitamin C

Vitamin C is an important antioxidant and exerts powerful neuroprotective brain effects. Vitamin C is present in brain tissue at higher concentrations than in other organs. Several controlled trials have found significant effects of vitamin C against pneumonia and the common cold. Vitamin C has both antioxidant and anti-inflammatory effects.

### Vitamin D

It has been found by an Italian study that children with paediatric neuropsychiatric conditions like PANS and PANDAS have low levels of vitamin D. Vitamin D regulates serotonin concentrations in the brain and this may partly explain how a lack of vitamin D could influence the trajectory and development of neuropsychiatric disorder. It is anti-inflammatory and is particularly helpful in those with autoimmune conditions.

### Zinc

As well as having antioxidant and antiviral properties, zinc is also important for the creation of our digestive juices. Those with a zinc deficiency often have a poor sense of taste and smell, zinc is also needed to create gastric secretions such as hydrochloric acid and pancreatic enzymes which is important when eating restrictions are part of the PANDAS picture. Baseline zinc levels tend to dip during puberty as it is also needed to form reproductive organs.

### Magnesium

Magnesium is a muscle relaxant and is also helpful at reducing anxiety and stress. Depleted magnesium levels have been found in chronic inflammation states as well as Tourette's syndrome.

### Omega 3

Another natural anti-inflammatory, this essential fatty acid has been found to decrease overall lung tissue inflammation as well as reducing cell death in pneumonia. It has also been shown to reduce bed wetting (enuresis).

### Healthier Food Choices

What we choose to eat can hugely impact our immunity and the underlying drivers of inflammation. Several studies show that the most important step we can make is to start cooking more of our food from scratch. Research finds that a Mediterranean diet rich in vegetables, fruits, pulses, nuts, seeds, omega-3 rich oily fish and whole grains reduces inflammation considerably, while a fast food diet can drive it right up. Convenient ultra-processed foods have been widely found to increase inflammation. Since convenience foods now fill over 50% of our shopping trollies you can probably see why chronic inflammation is becoming such a problem.

Turmeric, garlic and ginger are spices with anti-microbial and anti-inflammatory properties and are good tasty additions to your family meals.

One of the main drivers behind writing my book *The Good Stuff* was the realisation of how our food choices affect our children's health and how difficult it is to feed kids a healthy diet these days. This cookbook gives parents a toolkit to support healthy immunity and tips on how to keep inflammation in check, as well as lots of delicious recipes that kids simply love to eat.

## **Gut-Brain Connection**

The gut-brain axis is one of the most exciting areas of medical research today and it is thought that the balance of microbes in the gut can determine whether we are able to fight infections efficiently or whether an auto-immune response occurs. This is where getting a grasp on the diversity of a person's microbiome can give us information on how to support the immune system to best adapt to day to day challenges and keep inflammation under control.

## **The Role of Polyphenols**

### **N-Acetyl Cysteine**

NAC is the precursor to glutathione which is our master antioxidant, and this regulates immunity, detoxification and inflammatory pathways and has been found to modulate a cytokine storm. It has been specifically studied for use in obsessive compulsive and related disorders with favourable outcomes. NAC has been found to help those with repetitive or stereotyped behaviours, lethargy, and social withdrawal.

### **Turmeric**

Turmeric is well established anti-inflammatory spice and reduces pro-inflammatory cytokines. It has anti-bacterial action against several bacterial infections. It also a helpful intervention for those with neuropsychiatric and neurological disorders including autism. It is neuroprotective which helps to protect the brain and neurons from damage via inflammation.

### **Quercetin**

Quercetin is a neuroprotective polyphenol and modulates allergy response. It has also been studied in those with acute respiratory infections especially in paediatrics and it helps to reduce infection mediated lung inflammation and cell damage in childhood pneumonia. There is also evidence it can breakdown the biofilm of *Streptococcus pneumoniae* in pneumococcal infections such as pneumonia, otitis media (ear infections) & meningitis.

### **Resveratrol**

Resveratrol is a polyphenol derived red grapes and red wine. It has been found to have antiviral activity and has also been used to help reduce asthma symptoms. It has been studied in helping a wide range of autoimmune conditions. Research has shown that resveratrol has bioactivity-containing antioxidative, anti-inflammatory and neuroprotection

### **Pycnogenol**

Pycnogenol or extract of French maritime pine bark is naturally anti-inflammatory and has been found to be neuroprotective and can cross the blood brain barrier. It has been used as a natural antihistamine to support allergies, asthma, hay fever and mast cell activation and its affect is comparable to that of sodium cromoglycate.

### **Palmitoylethanolamide (PEA)**

Supplementing with PEA has been scientifically shown to naturally assist in the reduction of inflammation and to have neuro-protective and neuropathic pain control. This natural anti-

inflammatory supports the nervous system and abnormal immune responses. Has been shown to be or assist the immune system support including against flu and the common cold.

### Other Drivers of Inflammation

Sometimes inflammation is chronic and active because of some deeper metabolic or gut issues. In cases of neuroinflammation we usually run organic acid and amino acid urine testing which can be used to identify other drivers of chronic inflammation. This can include functional medicine reviews of gut microbiome, mitochondrial health, methylation, glutamate/GABA balance and histamine levels.

Nutritional and medical strategies can be put in place if any of the above metabolic issues are identified, and in time the inflammation should be much better managed. Understanding more about a child's unique metabolic wiring can help to provide a more individualised support, and interventions can be put in place to help to protect them from inflammatory cytokines being triggered in the first place.

The aim for every child is to aim to work on their underlying immunity and inflammatory pathways, so that that any future PANS/PANDAS flares are less invasive and shorter, and the eventual goal is to stop future flares entirely.

However, as with all infection-mediated autoimmune conditions, flares can occur at any time, especially when the child is exposed to new infections and can happen so quickly it can take you all by surprise. If a child is in the middle of an auto-immune neuroimmune flare, then it is important to work on cooling this inflammation from every angle possible – both medically and with individualised nutritional and lifestyle interventions, to help get them back on track sooner.

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