

## PNI: A new pathway to understanding MS

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### What is PNI?

We recently wrote an article in the October 2007 In Touch Magazine (ring ... for back copies) about maintaining a Healthy Immune System as a positive way of keeping in control of your MS. We emphasised the importance of taking appropriate exercise, maintaining good nutrition, good sleeping patterns, obtaining adequate and safe sun exposure, managing your mood and stress, and avoiding negative thinking styles. You might think that this is all fairly straight forward but in actual fact it is at the heart of managing MS and it may be light at the end of the tunnel to finding out how we might reduce the incidence of this disease in the future. The PNI model is teaching us more about what we can do to improve our health and therefore how we can keep MS better controlled.

It appears that MS is increasing more than population trends. Why is that? If you have MS, you know that it can be affected by your psychological makeup and what is happening around you. Many people will tell you that they had a serious stress prior to being diagnosed with MS. Do these very stressful events play a part in the causation of MS? When we presented PNI at the International MS Conference in Sydney in 2006 the audience connected with the theme because of their own experiences, and there were more comments and feedback from people with MS regarding this part of the Conference than any other part.

So what is PNI? While the actual scientific study behind PNI is called psychoneuroimmunology, in simple terms, "P" stands for psychology, "N" stands for neurology, "I" stands for Immunology. Neurology and Immunology have been the foundation of much of current knowledge about MS. However, we are learning that both the neurological and immunological systems are completely tied up with the psychological system. How this happens is something we intend to explain in a later article. This connection probably does not come as a shock to most of you but researchers tend to work in very strict fields and do not easily see the connection. Therefore, the MS Society wants to put the "P" firmly back into the mix. We feel that by doing so we can better understand how we can help people, help researchers better understand the complexity of the human body and therefore what other questions they should be asking, and most of all, we hope to gain a better understanding of the "P" in the puzzle leading a person to getting MS.

*(Note: The more precise word for this approach should probably be: geneticoviropsychoenviroendocrinoimmunology because a fully holistic model of MS includes the study of genetic, viral, psychological, environmental, neurological, endocrinological, and immunological factors. While PNI tries to incorporate all these elements, its main focus is on the interaction between the neurological, endocrinological, immunological and psychological systems. The interesting elements of genetics and environment will be discussed in future articles.)*

### What is the evidence for the PNI approach to MS?

Below, we give you a brief overview of all three components of PNI as it applies to MS and try to show how they all work together.

For decades, there has been growing evidence for PNI being crucial in relatively common diseases such as cancer and heart disease where psychology plays an important part in the development of these common diseases. Over the last ten years, the amount and significance of this growing body of scientific discovery has accelerated and broadened in depth and breadth. For instance, the effect of psychological factors in cardiac disease has been known since the 1950's. We are only just learning about how psychological factors can be a trigger in cancer as well as how by controlling stresses there can be a positive benefit to the person.

The Immune System is controlled amongst other things by hormonal and endocrine factors. We are only just now learning about how the "gender hormones" comprised of androgens, oestrogen and testosterone, have in modulating MS activity. Hormonal and endocrinological activity appear to have direct effects on MS processes as well as indirect effects via their influence on immune and neurological activity. For example, while it used to be thought that inflammation-stimulating catalysts in the brain were set off solely by immune cells and neurochemicals crossing the blood-brain barrier, it has recently been revealed that such inflammatory triggers can enter the central nervous system not just by crossing the blood-brain barrier but by using hormones as a facilitator to cross directly via the cerebrospinal fluid (the fluid that bathes the brain and spinal cord).

We are also leaning more about Vitamin D and its effect on MS. Vitamin D is a powerful active biological agent that acts as a switch that can turn genes 'on' and 'off' in virtually every tissue of the human body. Over the past decade or so, scientists have discovered that genes with critical roles in a variety of cellular defences are influenced by Vitamin D. Despite the fact that too much sun exposure can lead to melanoma in some people, many epidemiological studies have shown that sun exposure actually reduce the incidence of a number of cancers. Through the process of evolution, Vitamin D has also developed a capacity to reduce inflammation (so as to limit the negative effects of inflammatory responses to sunburn) and this ability can have a positive benefit in MS. It also appears that Vitamin D can limit cytokine activity in autoimmune diseases like MS. Cytokines are part of the immune system. They can make MS worse like Interferon Gamma or they can help to suppress inflammation in the brain like Interferon Beta (Avonex, Rebif and Betaferon). Vitamin D can repress exaggerated and inflammatory responses by inhibiting cytokine cross talk, which is one way by which communication between the immune, endocrinological, nervous and psychological systems occurs.

### **How does psychology and stress affect disease?**

In terms of psychology, both personality (or a person's behavioural characteristics) and stress have been found to be influential in MS genesis and progression. From both animal and human studies, it has been shown that there are stable behavioural characteristics that are related to physiological traits and patterns. What we are saying here is that the way we behave affects what happens to us. An overt example is the young man displaying high risk taking behaviour, which leads to injury. This is something we can see. However, our behaviour can affect us much or more in ways we cannot see. The way we live our lives, and how we handle the stresses in our lives affect us internally or "physiologically". We can often see this in the faces of people who have not had a healthy life in that their nutrition has been poor, they have had an excess amount of sun, their bodies have

been affected by smoking and alcohol to excess and the stresses on their lives have taken their toll.

These internal physiological patterns seem to be connected to different diseases depending on our own individual gene expression and the type of personality behaviour we are expressing. *This means that personality and disease type are strongly related.* In particular, these distinctive patterns are related to stress reactions and appear to play substantial roles in autoimmune diseases such as MS. Acute stress that resolves relatively quickly has been found to initially boost the immune system and, if this happens early in life, can actually be protective against certain diseases. However, intense and prolonged stress can have very different results.

Studying animals has been helpful because animals do not have the ability to consciously control stresses like humans do. What has been demonstrated is that the control of stress can be improved through learning alternate coping strategies in both animals and humans. Animals and humans that end up with chronic elevations of their "alert systems" have been found to experience a gradual depletion of cortisol responses and depleted immune capacities. Chronic stress has also been shown to have similar results to intense trauma experiences that impair the relationship between the immune, neurological and endocrinological systems even further. In relapsing/remitting MS, excellent Australian research has demonstrated that exacerbations are not particularly related to major stresses of life but are strongly connected to the number of minor stresses people face.

### **Why should we adopt the PNI approach at the MS Society?**

The PNI approach that has been adopted by the MS Society of NSW/Victoria is one that focuses on helping people with MS to keep their immune systems as healthy as they can. This means having a truly holistic approach to MS management. It means coaching and encouraging people to take appropriate exercise, maintaining good nutrition, obtaining adequate and safe sun exposure, managing their mood and stresses, and avoiding negative thinking styles. PNI places management of people's health & illness in their own hands. It augments the self-management model which is already part of the MS Society's client service plan and helps individuals to understand their condition and therefore the best ways to manage it. Such an approach enables people to take charge of their own well-being, their treatments and the risk minimisation strategies they choose. The PNI approach requires good knowledge and understanding of MS and the MS Society will be providing further information over the next year to help people in the understanding. MS staff will also be able to offer advice on the best self-management strategies for people with MS to achieve and maintain the healthiest immune system they can. This approach to MS management is uniquely Australian although the PNI concept is an international one.

So remember PNI and talk to your medical practitioner about it, although he or she might not be sure what you are talking about. Tell them it is primarily about maintaining a health lifestyle which in turn is about taking appropriate exercise, maintaining good nutrition, obtaining adequate and safe sun exposure, managing your mood and stress, and avoiding negative thinking styles. Talk to staff at the MS Society and keep reading *InTouch* magazine for further information and updates.