

PREVENTIVE CARE IN FOCUS

NUTRITION AND ORAL HEALTH A NATURAL LINK

Specialist in endodontics Alan Holland has developed an interest in complementary medicine, particularly dietary supplements, relating to oral and all-round health. Here he explains how changing lifestyles have influenced our immune systems, and how supplements can help address problems



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There are many established links between diet, lifestyle and oral health. Excessive sugar (and poor oral hygiene) is obviously a recipe for caries; too many low pH drinks or foods contribute to demineralisation; tobacco and high octane alcoholic beverages both increase the risk of oral cancers, especially when combined; smoking is linked to tooth loss. As the evidence base for these links has accumulated, various theoretical nutritional strategies have come on stream, such as non-cariogenic sweeteners and the use of xylitol as a selective bacterial poison, which have done a great deal to improve oral health. But there is a good deal more to come. It is becoming increasingly obvious that patients' immune functions, so critical in determining the risk and severity of periodontal disease, are profoundly affected by their nutritional status; and that this offers the practitioner a series of novel therapeutic dietary tools.

MALNUTRITION

If we review the risk factors for periodontal disease, they include (apart from xerostomia and poor oral hygiene) age, smoking, the use of immuno-suppressant medications such as steroids, HIV, diabetes and malnutrition.

At the time of writing, and although both diabetes and HIV are increasing, it seems likely that malnutrition is the most common of these risk factors. For example, recent studies have shown that up to 60% of patients entering hospital are malnourished¹, about half of this group malnourished to the point where they presented with lymphopenia (ie were very significantly immuno-compromised)^{2,3}. Given that patients' nutritional status often worsens during their stay in hospital, and that hospitals have a higher incidence of antibiotic use and resistance, the continuing failure to deal effectively with the epidemic of MRSA and *Clostridium difficile* is unsurprising. What is surprising, however, is the resistance to the use of nutritional enhancement as a way of reducing the toll of hospital-acquired infection; especially as there is data showing that immune status can be improved in hospital patients with fairly basic nutritional support⁴⁻⁶.

The vast majority of cases, as referred to above, are not classical (Type A) malnutrition; a condition characterised by deficiency symptoms and often combined with acute calorific shortfall. Instead they have Type B malnutrition, which is characterised



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by multiple micro- and phyto-nutrient depletion combined with calorific balance or, increasingly frequently, excess (Type B malnutrition has recently been described as 'dysnutrition' by Catherine Bertini, former chairperson of the UN Standing Committee on Nutrition).

The most important cause of Type B malnutrition is low-energy expenditure. Our food intakes have practically halved since the Victorian era, thus halving our intakes of many micro- and phyto-nutrients. Dietary shift makes matters worse, as we have moved far from the rather basic, but highly nutritious, mid-Victorian diet (the manual workers diet contained 7-10 portions of fruit and vegetables a day), towards a food pyramid that seems for some to consist entirely of pre-prepared processed junk food.

THE IMMUNE SYSTEM

Improving a patient's general nutritional status, therefore, will often lead to an improvement in immune function. But there is much more that can be achieved with the judicious use of immuno-primers and immuno-amplifiers. This article focuses on immuno-priming; immuno-amplification, although very promising, is still in the early stages of development.

The immune system can be divided into two sub-systems that coordinate, but have many separate actions and functions; namely, the acquired and the innate immune systems. The innate immune system protects us for over 99% of the time, confining pathogenic bacteria, viruses and moulds to safe and generally surface areas of the body and, self-evidently, preventing the vast majority of them from gaining access to deeper tissues where they could cause problems.

Immune cells in the innate immune

system have no memory, but they have receptors which recognise a small number of compounds presenting in the cell walls of most pathogens. These include lipopolysaccharides (Gram negative bacteria), lipoteichoic acids (Gram positive bacteria), peptidoglycans (Gram + and - bacteria), flagellin, and the 1-3, 1-6 beta glucans present in the cell walls of moulds and yeast. These receptors enable the innate immune cells to recognise the vast majority of potential pathogens, and respond rapidly and effectively to them. In fact, work at Brown University, the Universities of Louisville and Berlin, and at the Mayo Clinics has shown that constant stimulation of these receptors is actually necessary to keep the innate immune cells in a fully functional mode; and that the beta glucans in moulds and yeasts are the most effective of all the immuno-primers, acting via the CR3 receptor which occurs on all innate immune cells⁷⁻¹².

These compounds are called immuno-primers rather than the older term 'immuno-stimulants', which is inaccurate and misleading. They do not stimulate the immune cells at all, but merely prepare them for action. For innate immune effector cells (such as a macrophages or neutrophil granulocytes) to phagocytose and kill pathogens most effectively, the CR3 receptor must be occupied; supplying beta glucans in pure form to occupy this receptor is simply getting the immune cells ready to act as and when it is appropriate for them to do so.

Humans - and other animals - evolved in an environment without soap, antibiotics,

or food sterilisation technology; in short, a highly microbiologically contaminated environment. In such an environment, our innate immune systems were constantly challenged, and constantly on high alert. In the last century,

however, we have progressively

sanitised our environment. The food chain in particular, in which formerly every item would have been at least borderline contaminated with yeast/mould, has been sanitised to near sterility thanks to the agricultural use of fungicides, and modern food technology. This in turn has left our immune systems unbalanced (the so-called 'hygiene hypothesis'), resulting in reduced immune function and, paradoxically, a hugely increased incidence of allergy.

Some clinical scientists have speculated that allowing people to acquire infections more frequently would be helpful, but this is a crude and potentially dangerous approach. Far simpler to re-engineer 1-3, 1-6 beta glucans back into our diet, via supplements; a strategy already shown to dramatically enhance immune function and reduce the risk of disease in many species including our own¹³⁻¹⁸.

In my clinical experience of over 10 years working with nutritional support, and when combined with broad-spectrum supplement support of the ailing innate immune system, this approach leads to rapid improvements in oral health and a more predictable result following root canal therapy.

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