

'Detox': science or sales pitch?

There is no question that the world is becoming increasingly toxic, with worldwide dissemination of industrial chemicals, pesticides, heavy metals and radioactive elements. Many of these toxins have demonstrated harmful effects including cancer, reproductive, metabolic, and mental health effects.¹ It is also known that many toxins undergo bioaccumulation through the food chain² and that synergistic effects can occur whereby combinations of toxins can be more potent than the sum of individual toxins.³

While our bodies continually undergo natural detoxification through various excretory functions, toxins are not equally distributed. Different toxins tend to accumulate in different tissues with many toxins being stored in lipid deposits where they persist and accumulate over the lifespan.⁴ As there are few natural means for the excretion of fat bound toxins, it is possible that these toxins contribute to a range of disorders including the development of common cancers such as breast, prostate and leukaemias which all originate in fatty tissues.

Measuring toxic load

While it seems that an increasing burden of toxins is an inevitable consequence of living in the modern age, the measurement of the body's toxic load is still in its infancy. The measurement of various toxins can be performed in different body tissues including blood, urine, hair, sweat, fat, saliva, breast milk, and semen; while tests involving metabolic challenges can measure the activity of different detoxification pathways. Very few laboratories however, are set up to provide comprehensive toxin assessments and these measures are seldom performed clinically. It is also difficult to interpret their meaning, for although the signs and symptoms of overt toxicity are known for some compounds, the relationship between toxic load, clinical symptoms and disease remains uncertain. Therefore, while the science of toxicology is able to determine lethal doses and the toxicokinetics, toxicodynamics and toxicogenetics of different toxins, the clinical significance of 'sub-toxic' doses is difficult to assess, particularly for multiple compounds.

While it may be difficult to determine a person's toxic load and its clinical significance, the concept of detoxification has a long history. Ancient medical systems such as the Indian science of Ayurveda, describe cleansing and purification processes, and traditional Chinese

medicine has many procedures for *jie du* (removing toxins). Detoxification is also at the core of naturopathic medicine that considers 'toxic load' as the basis of many diseases.

'Detox' programs

In recent times 'detox' has become a consumer buzz word and there has been a proliferation of 'detox' measures within the broader consumer market including juices, diets and nutritional supplements, saunas, scrubs, purging, fasting, colonics, exercise, oral, rectal and intravenous chelating agents, and the emergence of detox programs and retreats that combine multiple modalities.

Despite the abundance of available detox measures, it is not yet possible to base their use on rigorous scientific evidence. Very few programs actually establish what 'tox' is, let alone 'detox' and there is little documentation about toxin elimination and associated clinical outcomes. It appears that the science of detoxicology is still in its infancy and while there are hundreds of randomised controlled trials on drug and alcohol detox, there are no such trials of detox programs focusing on environmental toxins.

Of the clinical detoxification studies that exist, the majority are observational studies on a detoxification program promoted by the Church of Scientology. This program, which is also the basis of the controversial Narconon Drug Rehabilitation Program,^{5,6} received attention after it was used to treat rescue workers exposed to multiple toxins after the World Trade Centre towers disaster.^{7,8} This program involves the use of high dose niacin along with other vitamins, minerals and polyunsaturated oils in conjunction with physical exercise and extensive sweating induced by sauna. A number of case reports,^{9,10} cohort studies^{8,11-13} and nonrandomised, controlled trials¹⁴⁻¹⁷ suggest that this program can reduce the body burden of polychlorinated biphenyls (PCBs), and polybrominated biphenyls (PBBs), dioxins, and various drugs and pesticides.^{8,13-16} In addition, the program has been shown in preliminary studies to reduce symptoms^{8,11,14,15} and improve neurophysiological and neuropsychological function.^{8,11,12,17,18} However, confirmation by more systematic and rigorously controlled trials is required.

Conclusion

While a modern science of 'detoxicology' seems to be emerging, evidence based detoxicology still seems quite far off, and at present 'detox' is certainly more of a sales pitch than a science. It must be noted however, that lack



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of evidence for an effect does not mean lack of effect. Therefore, there may be clinical benefits from some detox programs and this seems to be a fruitful area for further research.

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