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FOR CHRONIC ILLNESS & ALLERGY

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## THE AUTONOMIC NERVOUS SYSTEM

By Dr. Robin Bernhoft, MD, FACS, DABEM, FAAEM

Most people are familiar with the Central Nervous System (CNS, the brain) and the Peripheral Nervous System (PNS), which carries messages from the brain to the muscles, and sensory messages back to the brain. Fewer people are familiar with the Autonomic Nervous System (ANS).

The ANS is not ordinarily under our conscious control. Which is a good thing, for the most part, because it controls a lot of subconscious functions: heart rate, blood pressure, blood flow to the skin and digestive organs, and so on. The ANS is divided into two parts: the Adrenergic, which stimulates much like adrenalin, and the Parasympathetic, which calms things down.

Many chemicals and metals have a profoundly disturbing effect on the ANS. Pesticides can be especially damaging, because they generally interfere with acetylcholine, which is a major neurotransmitter in insects. Many pesticides kill insects either by blocking acetylcholine, or by overstimulating it. They play a similar but less quickly lethal role in our ANS by the same biochemical mechanisms.

Consequently, pesticides can sometimes produce dramatic symptoms. For example, to use my own case, when I (Dr Bernhoft) was recovering, I noticed that when I went to a medical meeting and ate non-organic (presumably pesticide-ridden) food for 4 or 5 days, my blood pressure would go from its baseline 110/70 to 160/100 or 170/110. Then, when I came home and resumed my organic diet and saunas, it would drop back down to baseline over the next couple days. There was no discernable difference in salt content of my food. It seems to me that I was unusually sensitive, at the time, to the ANS effects of pesticides. They no longer seem to bother me. I have probably cleared out enough of my body pesticide load and given my liver detox enzymes enough cofactors to work with, that these things are less of an issue for me than they once were.

A parallel example has emerged in recent years: the heart attack rate in major cities closely parallels the air concentration of particles called PM2.5 (mostly particles of diesel exhaust). It is thought that these particles lodge in the lungs, stimulate the ANS, thereby either disturbing the heart rhythm or increasing inflammation and plaque rupture, causing heart attacks. The health of the ANS matters.

We have an objective measurement of ANS health in our office, the Inteliwave Heart Rate Variability System, which is approved by the FDA for use in Heart Rate Variability (HRV) measurements. It measures changes in HRV caused by changes in position or deep breathing. It provides an index of ANS health, and can be used to measure progress; as detox continues, ANS status generally improves. Dysautonomia is treatable without Midodrine and support stockings.



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**Selected References:**

1. Perry F, et al. Altered autonomic function in patients with arthritis or with chronic myofascial pain. *Pain*. 1989; 39:77-84
2. Kilburn KH et al. RR Interval, postural hypotension, Shy-Drager in adults exposed to chlorine-cresylate, hydrogen sulfide, molds and other chemicals: signs of autonomic nervous system dysfunction? *Proceedings of 23rd Annual International Symposium on Man and His Environment in Health and Disease*, June 9 -11, 2005, pp. 67-75.
3. Straub RH et al. Integrated evolutionary, immunological and neuroendocrine framework for the pathogenesis of chronic disabling inflammatory diseases. *FASEB J* 2003; 17:2176-2183.
4. Bigger JT Jr, Rottman JN. Spectral Analysis of RR Variability. Chapter 19 in *Cardiac Arrhythmia: Mechanisms, Diagnosis, and Management*, Podrid PJ, Kowey PR editors. Baltimore: William & Wilkins, 1995, pp.280-298.
5. Rottman JN, Steinman RC, Albrecht P, Bigger JT Jr, Rolnitzky LM, Fleiss JL. Efficient estimation of the heart period power spectrum suitable for physiologic or pharmacologic studies. *Am J Cardiol* 1990; 66:1522-1524.
6. Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology. Heart rate variability. Standards of measurement, physiologic interpretation, and clinical use. *Circulation* 1996; 93:1043-1065.
7. Hornby PJ, Abrashams TP. Central control of lower esophageal sphincter relaxation. *Am J Med*. 2000; 108(Supple4a):90S-98S.