Autonomic nervous system dysfunction in obesity and Prader-Willi Syndrome: Current evidence and implications for future obesity therapies
Haqq AM, DeLorey DS, Sharma AM, Freemark M, Kreier F, Mackenzie ML, and Richer LP. *Clinical Obesity* 1: 175-183, 2012.

The autonomic nervous system (ANS) controls essential functions like breathing, heart rate, digestion, body temperature and hormone levels. Evidence suggests that ANS dysfunction is associated with adult and childhood obesity and plays a role in the distribution of total body fat and the development of obesity-related complications in humans. This review summarizes our current understanding of ANS involvement in the development of obesity and Prader–Willi syndrome. Available evidence of ANS dysfunction in the control of energy balance is limited and, in some cases, contradictory. Further investigation in this area is warranted in order to better understand the important contributions of the ANS to regulation of body fat, development of obesity and its comorbidities. Results from these studies will guide the development of novel obesity treatments and care targeting specific ANS dysfunction.

The metabolic phenotype of Prader-Willi Syndrome in childhood: Heightened insulin sensitivity relative to body mass index.
Haqq AM, Muehlbauer MJ, Newgard CB, Grambow SC, and Freemark M.
Journal of Clinical Endocrinology and Metabolism 96(1):E225-232, 2011.

Insulin sensitivity is higher in patients with Prader-Willi syndrome (PWS) than in body mass index-matched obese controls (OC). Factors contributing to the heightened insulin sensitivity of PWS remain unclear. We compared the fasting levels of various hormones, cytokines, lipids, and liver function tests in 14 PWS patients to 14 OC, and to 14 age- and gender-matched lean children (LC). We hypothesized that metabolic profiles of children with PWS are comparable with those of LC, but different from those of OC.

Leptin levels were comparable in PWS patients and OC, suggesting comparable degrees of adiposity. Glucose levels were comparable among groups. However, fasting insulin concentrations and homeostasis model assessment insulin resistance index were lower in PWS patients than in OC ($P < 0.05$) and similar to LC. Moreover, high-density lipoprotein (HDL) levels were lower and triglycerides higher in OC ($P < 0.05$) but not PWS patients. Total adiponectin, high-molecular-weight (HMW) adiponectin and the HMW to total adiponectin ratio were higher in PWS patients ($P < 0.05$) than in OC and similar to LC. High-sensitivity C-reactive protein and IL-6 levels were higher in OC than in PWS patients or LC ($P < 0.05$). Nevertheless, PAI-1 levels were elevated in both OC and PWS patients. The heightened insulin sensitivity of PWS patients relative to OC was associated with higher levels of adiponectin and lower levels of high-sensitivity C-reactive protein and IL-6.

Results from this study suggest that patients with PWS may have metabolic profiles comparable to LC. Future studies are needed to determine whether PWS children are therefore protected from obesity comorbidities such as type 2 diabetes, hyperlipidemia, and nonalcoholic fatty liver disease.