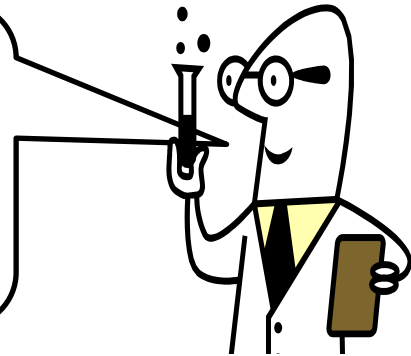




**ARE ABNORMAL HORMONE SERUM LEVELS  
A BIOMARKER OF CENTRALIZED PAIN?**

Dr. Hormone says,  
“Yes, in almost all cases, an abnormal  
(high or low) hormone serum level in  
a chronic pain patient indicates the  
presence of microglial cell activation  
and neuroinflammation.”



**SEMINAL STUDY:**

Many studies show that the usual chronic pain patient has normal endocrine function.

For example, male osteoarthritic patients had normal serum hormone levels.

*(Khormi, et al. Effect of chronic osteoarthritis pain on neuroendocrine function in men. Clin Endo Metab 2006;11:4313-4318.)*

**PHYSIOLOGIC FACT:**

Severe centralized pain with microglial over-activation and neuroinflammation will stimulate the hypothalamic-pituitary-adrenal axis to raise serum levels of such hormones as pregnenolone, cortisol, and DHEA. The stimulation may be so great, over-time, that serum levels of hormones deplete because the production glands can't keep pace.



Dr. Techy says,  
“Treatment agents that  
modulate microglial cells  
MAY normalize serum  
hormones.”



Tennant  
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