The HPA Axis: The "Home" of Alcoholism

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Introduction

The "home" of alcoholism resides in the HPA (hypothalamus-pituitary-adrenal) axis of the neuroendocrine system. Now that we know where the well-defined biochemical markers of addictive chemistry live, we can use extremely sophisticated tests which monitor the performance of this axis under various conditions by measuring dopamine, endorphins, enkephalins, serotonin, GABA, glutamate, epinephrine (adrenaline), norepinephrine (noradrenalin), cortisol and DHEA which are the eight main neurotransmitters and two key hormones which define either the health of the neuroendocrine system or its state and depth of illness.

Addictive or addicted biochemistry is essentially the body's inability to adequately self-medicate with the natural stress hormone cortisol, and feel-good neurotransmitters such as serotonin, GABA, dopamine, enkephalins and endorphins which predisposes an individual to seek relief in external ways such as alcohol. Addictive biochemistry is associated with an excess of excitatory neurotransmitters which cause an upregulated sympathetic nervous system where, due to the ensuing low GABA, serotonin, and endorphins, excitatory neurotransmitters such as glutamate, norepinephrine and epinephrine are overexpressed which cause the many symptoms problem drinkers are known to self-medicate. It is also the bedrock of the progression of alcoholism because the longer one drinks, the more damage is done to the neuroendocrine system rendering it progressively unable to medicate the body naturally which intensifies symptoms which then causes one to drink more. This applies to both those actively drinking and those abstinent because rarely do they include healing this system–instead, they typically adopt diets high in sugar, carbs and caffeine which, while producing short episodes of elevated serotonin/GABA and endorphins, continues the very same damage alcohol produced.

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The HPA Axis and Alcoholism

The biochemical markers in the brain chemistry which spell alcoholism are low endorphin, enkephalin, GABA, serotonin and dopamine expression which results in the over expression of the sympathetic nervous system; glutamate, epinephrine and norepinephrine. It doesn't necessarily have to be all of these; it could be just one or two out of balance that can engage the practice of self-medicating. The symptoms experienced can vary depending on the exact deficiencies/excesses of these neurotransmitters combined with adrenal fatigue and extreme blood sugar fluctuations, but they can include depression, mental/physical fatigue, panic attacks, cravings for simple carbs, low self-esteem/confidence, and anxiety or restlessness, to name a few. Just a couple of ounces of alcohol can fix all of these because it immediately raises the deficient "feel good" neurotransmitters serotonin, GABA, dopamine and endorphins. The price to pay is high, though, because on the other end comes the bottoming out of the already inherently low levels of the same neurotransmitters. What causes this imbalance between the parasympathetic and sympathetic nervous system is usually an over stimulating environment (stress, emotional pain, lack of stability, constant change), neurotoxins (aspartame/MSG) found in our "food" supply, diets high in sugar and caffeine, heavy metal toxicity, environmental sensitivities, pollutants,

and food allergies. Life on the planet today is far too stimulating; we get more mail in a day than people got in a lifetime a hundred years ago. And our bodies have endured more change in the environment in the last 100 years than that of the last 10,000 years, making it nearly impossible for our neuroendocrine system to maintain homeostasis. This over-stimulating internal and external environment causes the inhibitory system to burn-out allowing the excitatory to rise which creates the symptoms. Biochemically many people are in a state of flight or fight from the time they wake up, and the mind responds to the chemical messengers as if it is in crisis all day long because the brain interprets this stimulus as a threat; the body is producing the chemicals as if a tiger is chasing it but there is no tiger. The mind knows this but the brain doesn't. Malnutrition also plays its part by not providing the body with the amino acid precursors and vitamin/mineral/EFA cofactors to produce healthy brain chemistry.

Due to the continual extreme demands on the adrenals, problem drinking invariably fatigues the adrenals and brings the problem drinker to a serious stress syndrome due to depletion of cortisol and the depressive effects of low serotonin and GABA. Consistent with Dr. Hoffer's work, B_3 therapy is key because niacin is exhausted metabolizing carbohydrates. Those addicted to alcohol are known for high carb diets which accompany their high sugar/carb alcohol habit. When niacin goes low, tryptophan will be converted to niacin which lowers serotonin stores. This is one very important pathway to imbalanced brain chemistry which requires attention in every alcohol addicted patient because low serotonin is not only associated with carb/alcohol cravings but compulsive behavior which is the hallmark of addiction. This "tryptophan steal" biochemical pathway is a key cause for the depression that follows many into sobriety because they typically replace alcohol with high sugar/simple carb diets which cause extreme niacin deficiencies.

Due to low cortisol/epinephrine, those addicted to alcohol will suffer from overexpression of norepinephrine which is known to cause irritability, anxiety, aggression, hypertension, and what is called bipolar disorder. In my practice I have found that most of the patients that come in having been diagnosed with bi-polar are actually in a state of severe adrenal fatigue and are hypoglycemic; their symptoms are primarily the product of extreme blood sugar fluctuations and adrenal fatigue–definitely not a condition that justifies a cocktail of dangerous psychiatric drugs.

What happens within the body of those who have been abusing alcohol for a while and have damaged their neuroendocrine system is this: while the person is drinking, GABA, endorphins, dopamine and serotonin are overexpressed and literally emptied out from the CNS and hypothalamus which gives them the relaxation and medication for their symptoms they desire. This over-production of inhibitory neurotransmitters leaves stores "empty" the next morning which causes the overexpression of glutamate and the catecholamines. The symptoms of this condition are any of those I've mentioned previously. Over time the negative feedback loop tells the system there are plenty of endorphins and enkephalins (due to tetrahydroisoquinolines saturating receptor sites) and production of the body's natural opioids is diminished while their receptors are down-regulated they won't have much of the natural pain killers available to mediate the hangover; which leads to the next drink. The internal environment with most people who rarely drink excessively is quite different; they have ample healthy stores of serotonin, dopamine, GABA, endorphin and enkephalin and they will immediately rise to the job

of balancing the overexpressed glutamate and catecholamines the next morning. In the long-term drinker this is impossible because their body's ability to manufacture and replenish healthy levels of these neurotransmitters has been diminished from the damage of alcohol toxicity and the resulting malnutrition.

Once the damage is established in the HPA axis by long-term drinking, the cycle becomes deeply embedded in the person's biochemistry because this condition renders them entirely dependent on alcohol to achieve peace and relaxation; they can't feel good inside their own skin naturally anymore, within a reasonable amount of time, and not without a bout of withdrawal which they are not inclined to endure. Finally, their lives become unmanageable.

Inherited and acquired imbalanced neuroendocrine function is caused by weakened or injured organs of the HPA axis caused by various sources of toxicity and chronic stimulus, and extreme blood sugar fluctuations over a considerable period as well as malnutrition. Alcohol metabolites such as acetaldehyde will also injure all of these organs in variable degrees making a considerable contribution to the addiction.

Alcoholism is extremely responsive to neurotransmitter repletion since it is their deficiencies and imbalance that is at the very root of alcohol addiction and the cravings so many of those who limit their recovery to support groups endure.

Symptoms of Long-term Alcohol Abuse Directly Related to HPA Function: Stress Disorder

Due to alcohol toxicity damage and malnutrition, adrenal fatigue causes low cortisol output which leads to high norepinephrine levels (overexpressed). This is because cortisol is required (along with SAMe) to produce epinephrine from norepinephrine. When this doesn't occur, norepinephrine rises while epinephrine and cortisol are diminished. Note that cortisol is required in some areas of the brain to activate serotonin, so when it is low it can also inhibit serotonin expression. This condition delivers one to the "alarm" stage of stress disorder due to elevated norepinephrine which can produce extreme anxiety, panic attacks, exaggerated fear (paranoia), worry, insomnia, depression, aggression, irritability, hypertension and even what is diagnosed as bipolar disorder. All of these conditions center on the deregulation of the HPA axis.

Baseline Biochemistry Measurements

Under controlled environments such as after a patient has detoxed from sugar, caffeine, pesticide ridden foods, OTC, street and prescription drugs, it is possible to achieve very accurate brain chemistry tests. Using HPA axis testing, we can measure the key neurotransmitters known to activate addictive biochemistry. Cortisol and DHEA levels are also tested to establish the degree to which the adrenals are damaged so that an appropriate treatment for the adrenals can be developed. Once the neurotransmitter deficiencies are exposed, the practitioner can develop a personalized, orthomolecular, targeted nutritional therapy (TNT) to bring the neuroendocrine system back into balance, optimizing the HPA axis and relieving the individual of the symptoms they self-medicate. Other contributing factors such as liver and GI damage are considered and addressed to provide the system with the best possible environment to heal and correct the "broken" metabolism and produce healthy, balanced brain chemistry. An insulin sparing diet, centered on rebuilding the liver, adrenals, hypothalamus and pituitary is required to maintain healthy blood sugar levels and facilitate the healing process.

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