Stress and Weight

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The human reaction to stress is designed as a survival mechanism for the body. It is a complex cascade of hormonal interactions that exert a profound effect on many physiologic systems to help protect us from internal (illness) or external (sabre-toothed tiger) danger. Unfortunately, in today's world, rather than a single fight-or-flight episode, such as running from a dangerous animal, our body is faced with a multitude of smaller but more chronic stressors such as unstable blood sugar levels, less than 8 hours of sleep, bad traffic or excessive workload. We also suffer from perceived stress, our mental interpretation of an event, such as a wedding, which causes identical stimulation to our nervous system without ever truly being "dangerous".

Despite man's many advances, our neurochemical and hormonal reactions to stress, (the Hypothalamic-Pituitary-Adrenal or HPA-axis), have not changed greatly since our caveman days. Designed for acute stressors that resolve rapidly, our present-day, chronic, low-grade stress results in the continual release of CRH (Corticotrophin Releasing Hormone) from the hypothalamus, that area in the lowest region of the forebrain, primarily concerned with survival. This chronic secretion causes dysfunction in the HPA axis, desensitizing the hypothalamic and pituitary receptors to negative feedback from adrenaline, noradrenaline and particularly, cortisol.

In this state, the hypothalamus also loses its ability to coordinate incoming information from the areas that control emotional behaviour, motivation and control of the internal and external environment — the limbic system, reticular areas, thalamus, amygdala and hippocampus. This loss of control creates exaggerated neurochemical, emotional and physical responses within the SNS (Sympathetic Nervous System), exacerbating HPA dysregulation.

Loss of negative feedback within the neuro-hormonal system creates a multitude of ailments and diseases. It increases the production of ADH, aldosterone, and angiotensin increasing blood pressure. It increases C-reactive protein and endothelin, promoting atherosclerosis and inflammation, and it directly increases LDL production.

Cortisol inhibits GnRH and increases GnIH (an inhibitory hormone that directly reduces GnRH release in the dorsal medial hypothalamus). Both effects reduce FSH, LH, estradiol and testosterone production. In addition it elevates prolactin in the non-pregnant female, inflames the uterus and causes fallopian tube spasm that can crush the egg en route to implantation.

Stress has a direct impact on inflammatory bowel disease. It increases the release of neurotensin, the gastrointestinal neuropeptide that alters NF-κB-dependent IL-8 expression in colonocytes, causing inflammation and disrupting healing in the bowel. It also stimulates histamine release from mast cells and IgG production in response to non-specific foods causing bloating, inflammation and mucous production.

One of the most detrimental and profound effects of chronic stress is weight gain. In a society where 65% of individuals are overweight and 31% are clinically obese, chronic stimulation of the HPA-axis can therefore be viewed as one of the most prevalent risk factors to our health. Cortisol inhibits the release of Leptin; this hormone simulates alpha-MSH and inhibits Neuropeptide-Y, reducing our appetite after a meal, and "jump starting" our metabolism. The inhibition of leptin not only increases food cravings but reduces our metabolic rate, and

impairs fat burning by over 60%. Stress also triples the release of insulin in response to grains, starches, sweets and fruits, forcing the body to treat one slice of bread as if it were three, one cookie as three cookies and so on. This promotes amplified fat storage, particularly in the abdominal region where white fat cells have three times the number of cortisol receptors on their surface. To make matters worse CRH and cortisol block the production and binding of both serotonin and dopamine. This combination of imbalanced hormones destabilizes mood and stimulates further food cravings.

Cortisol also inhibits PGC1-alpha, a substrate that is produced in our muscles when we exercise. PGC1-alpha increases the production of irisin, the hormone that converts white inflammatory fat into brown thermogenic fat. By blocking this pathway cortisol promotes weight gain, blood sugar instability and diabetes, independent of diet and exercise.

As Chronic Stress affects so many aspects of our metabolism, rebalancing our HPA-axis is crucial to prevent weight gain and ill health. Simply "mopping-up" excess cortisol is not sufficient as it fails to address the numerous other areas of dysregulation within the pathway (such as resistance and altered feedback) from hypothalamus to end-organ receptor.

To date there is only one natural supplement that is effective at all levels of the HPA axis to not only decrease glucocorticoid secretion but to rebalance the pathway. This supplement, Lactium is a bioactive decapeptide, alpha-1 sequence, isolated from milk. It works on three areas of the HPA-axis:

Lactium is the only casein peptide to bind specifically to the BZD site of the GABA-A receptor. Unlike benzodiazepines, the alpha-1 peptide does not bind to the PBR site of the GABA-A receptor, the site responsible for the sedating side effects of benzodiazepines. It has been clinically shown in vivo that the alpha-1 casein peptide is about 10 times more active than diazepam at the BZD site without causing drowsiness.

Lactium increases the sensitivity of the hypothalamus to cortisol, re-establishing normal receptor sensitivity feedback within the HPA-axis. It also reduces the amount of CRH produced in response to stress.

Lactium decreases the amount of cortisol released by the adrenal glands during acute and chronic stress.

Other natural supplements such as theanine, from green tea, can help inhibit beta wave brain activity, the activity that is responsible for incessant racing thoughts, and promote alpha wave activity, the calming focused brain wave activity. It can also help regulate serotonin, GABA and dopamine production, all favoring the quiet campfire state of mind.

GABA has a stress inhibitory effect on the hypothalamus, decreasing glucocorticoid secretion, and on the posterior amygdala, moderating feelings of fear and emotion.

Fucozanthin, a brown algae extract helps to up-regulate UCP1 (uncoupled protein-1) gene expression in brown fat. It increases mitochondrial output and REE (resting energy expenditure) promoting weight loss and blood sugar control.

Punicic acids from pomegranate seed oil help inhibit Delta-9 desaturase thereby preventing lipogenesis (fat manufacture and storage).

Another key element to further controlling cortisol and the HPA disruption is dietary modification. Blood sugars are balanced by eating lean protein at each meal, (such as fish, egg whites, high quality whey protein powders without artificial sweeteners, chicken and turkey) along with nutrient dense vegetables and legumes. Temporarily eliminating or minimizing the carbohydrates that trigger excess insulin release is also vital until the HPA axis is reset.

When negative feedback within the HPA-axis is disrupted, chronic hormonal secretion becomes "normal" for that individual. In this state, they either fail to recognize that they are stressed, or they experience an exaggerated emotional and physical response to every stressor, such as intolerance to noise or light, or a feeling of being overwhelmed when asked to perform a simple task. This often leaves them feeling helpless or defeated, one of the most unhealthy and powerless places to be. Although the external and internal stress load is certainly not decreasing in our society, we can regain control over our response to it, protecting ourselves from stress-induced illness.

NOTE:

Within my practice I use Lactium with Theanine as a combination called Sereniten Plus by Douglas Laboratories, and Fucozanthin and Punicic acids as Zanthitrim, by Pure Encapsulation in concert with nutrition, other natural supplements and lifestyle modification to provide a comprehensive approach to stress management.

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Penny Kendall-Reed is a Naturopathic Doctor in Toronto. After graduating from McGill University with a B.Sc. in Neurobiology, she earned a degree in Naturopathic Medicine from the Canadian College of Naturopathic Medicine, where she received the Dr. Allen Tyler Award for Most Outstanding Clinician. In 2013 she was voted Naturopath of the Year by her peers and colleagues. Penny Kendall-Reed is the co-author of 5 national bestselling books including The New Naturopathic Diet , Healing Arthritis, The No Crave Diet, The Complete Doctors Stress Solution and The Complete Doctor's Back Bible. Penny Kendall-Reed travels throughout Canada and the United States lecturing on neuro-endocrine related diseases and holds health retreats at various resorts worldwide. She appears regularly on television, magazine and radio across Canada and the United States addressing various health issues, and is a monthly health expert for several magazines including Health and Wellness Magazine and Best Health in Toronto. Penny Kendall-Reed has also designed an all natural oral and topical anti-aging skin care line called Age Aware Skin Care sold throughout Europe. Presently, Penny Kendall-Reed is the director of natural therapies at the Urban Wellness Clinic in Toronto.

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