

The Correlation Between Stress and Alopecia Areata

Melanie Moyer

Axia College of University of Phoenix

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Bob Durham

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Abstract

Although it is known throughout the medical community that stress can affect the human immune system, the correlation between stress and skin diseases, such as alopecia areata, is still a questionable concept. It is hypothesized that stress does have a direct correlation to the onset and reoccurrence of alopecia areata. Through numerous studies that have been performed by leading dermatologists around the globe, a connection will be shown between corticotropin-releasing hormones (CRH) and immune cells. These studies further prove that once these CRH receptors are released in volume, those that are predisposed to skin diseases will feel the affects.

According to the National Alopecia Areata Foundation (NAAF), approximately 4.5 million people in the United States or two percent of the population will be have an occurrence of a rather rare skin disease called alopecia areata. Alopecia areata occurs when the “hair follicles are mistakenly attacked in groups by a person's own immune system (white blood cells), resulting in the arrest of the hair growth stage” (*Frequently Asked Questions*, 2007). Scalp hair is the primary place of hair loss, however men and women also experience loss of hair in many other places of their bodies. Men afflicted with alopecia areata commonly lose facial hair resulting in alopecia barbae, a form of alopecia areata. The most recent research done by the NAAF suggests that “something triggers the immune system to suppress the hair follicle” (*Frequently Asked Questions*, 2007). However, this trigger is still an unknown variable and the question remains “whether it comes from outside the body like a virus, or from inside” (*Frequently Asked Questions*, 2007).

Unfortunately, the word *stress* is such a blanket term and is not easily defined. There are actually many different types of stress and for the purpose of this paper, it must be defined into categories. A person can experience short term stressors, commonly referred to as the “fight or flight” response. This form of stress causes the body's immune system to prepare itself for such events as punctures, scrapes and bites. A study performed by Segerstrom and Miller (2004) has proven that short term stressors actually boost the immune system and do not cause long term affects. However, chronic, long-term stressors such as life changes that are beyond a person's control can have a negative impact on the immune system. Through their exhaustive meta-analysis, Segerstrom and Miller (2004) were able to pinpoint that the most damaging stressor to the human immune system were chronic stressors. More importantly, those stressors “which

change people's identities or social roles, are more beyond their control and seem endless” (*How Stress Affects the Immune System*, 2005). During a period of chronic, long-term stress, a persons immune function dropped dramatically.

Mary Jones recently moved to New York City from a small town in Idaho. The hustle and bustle of the city were quite a change for Mary to acclimate herself. She began feeling tired all the time. After moving into a new apartment and searching for a job, Mary started noticing that her fatigue became stronger and she was catching colds frequently. She did not remember ever being so sick when she lived in her tiny Idaho town. Mary thought maybe it might be allergies so she made an appointment to see a general physician. After running numerous blood tests, the doctor could find nothing wrong and attributed Mary's poor health to simple everyday stress. In *How Stress Affects the Immune System* (2005), the author states that “many studies have shown that stress can suppress the immune system”.

“There is increasing evidence that stress influences disease processes and contributes to inflammation through vasoactive neuropeptides, lymphokines or other chemical mediators. Psychological factors precipitate or increase the morbidity of allergic reactions and many dermatoses” (Katsarou-Katsari, Singh, & Theoharides, 2001). In laymen's terms, the study proved, through skin biopsies, that the patients that had undergone acute amounts of stress for long periods of time also had a “skin stress response system” (Katsarou-Katsari et al., 2001) that was particularly related to the growth of hair follicles. The skin biopsies that were examined showed an increased amount of cortropin-releasing hormone (CRH) receptors around the hair follicles of the study patients but these receptors were not as prevalent in the control patients. Katsarou-Katsari et al. (2001) concluded that “the present results suggest that the use of CRH

receptor antagonists, alone or together with mast cell blockers, may be a therapeutic alternative in at least stress-induced alopecia areata.”

Another study performed by a group of physicians in Korea also links CRH receptors and corticosterone produced by the hypothalamic-pituitary-adrenal (HPA) axis to a skin response similar to alopecia areata (Kim, Cho, Kim, Lee, Cho, & Park, 2006). This study also involved skin biopsies from 15 alopecia areata patients and each biopsy showed that “corticotropin-releasing hormone expression was significantly increased in the epidermis, hair follicles and sebaceous glands of AA patients” (Kim et al., 2006). However, in this study, each patient's level of psychological stress at the time of the skin biopsy was measured by using the Holmes Rahe Social readjustment rating scale. Each patient either scored over a six out of 10 possible points of stress reactivity or had an immediate family member that also had alopecia. In conclusion, the study proved that there is “a causal relationship between psychological stress and AA” (Kim et al., 2006) and that there is a “statistically significant increase in the expression of CRH in the epidermis” (Kim et al., 2006). Due to outstanding studies such as these, the medical and pharmaceutical communities may be able to find a cure or suitable treatment for alopecia areata and other auto-immune skin diseases within the next 10 years.

During the research process for this paper, the author interviewed several women who are afflicted with alopecia areata. Each of the women were asked to fill out a simple survey identifying specific chronic life stressors that occurred within six months of the women noticing hair loss. One hundred percent of the women interviewed had some sort of long term stressor that they believed was the cause or antagonist for their hair loss. Each woman had a formal diagnosis of alopecia areata by a dermatologist or other physician and many had other

autoimmune disorders such as lupus, sjogren's syndrome, and hypothyroidism. The women were also asked to fill out the Zung Self-Rating Depression Scale which was evaluated to show the correlation between stress, depression and it's immunoreactive results. Many of the women scored on the higher end of the scale for mild depression or dysthymia.

Throughout this paper, it is shown how our human immune system is impacted negatively by stressful life events. Most importantly, the direct affect that stress has on CRH receptors and the destructive modification it can cause to hair growth. Therefore, it is proven that stress does indeed have a strong affect on the onset and reoccurrence of skin diseases such as alopecia areata.

References

*Frequently Asked Questions*. (2007). Retrieved on April 17, 2007, from <http://www.naaf.org>.

*How Stress Affects the Immune System*. (2005). Retrieved on March 27, 2007, from <http://mentalhealth.about.com/od/stress/a/stressimmune604.htm>.

Katsarou-Katsari, A., Singh, L.K., & Theoharides, T.C. (2001). Alopecia areata and Affected Skin CRH Receptor Upregulation Induced by Acute Emotional Stress. *Dermatology*, 203(2), 157-161.

Kim, H.S., Cho, D.H., Kim, H.J., Lee, J.Y., Cho, B.K., & Park, H.J. (2006). Immunoreactivity of corticotropin-releasing hormone, adrenocorticotrophic hormone and  $\alpha$ -melanocyte-stimulating hormone in alopecia areata. *Experimental Dermatology*, 15, 515-522.

Picardi, A. & Abeni, D. (2001). Stressful Life Events and Skin Diseases: Disentangling Evidence from Myth. *Psychotherapy and Psychosomatics*, 70(3). 118-136.

Segerstrom, S.C. & Miller, G.E. (2004). Psychological Stress and the Human Immune System: A Meta-Analytic Study of 30 Years of Inquiry. *Psychological Bulletin*, 130(4). 601-630.