

# Acupuncture and the Immune System

## The Effect of Acupuncture on Immune Cells

### **The Effect of Acupuncture on the Immune System: Part 1 - A Western Medical Perspective**

Cancer. The big “C”. There are few words more effective in filling us with fear or dread. Virtually all of us have either been directly affected by cancer or have had someone very close to us affected by cancer. The word “cancer” is an umbrella term describing a large variety of diseases all with one thing in common; a “growth” or “neoplasm” characterized by abnormal or uncontrolled growth of cells within the body. For various reasons, the standard cell growth and death cycle gets out of control and these abnormal cells may spread throughout the body (metastasis) and infect other cells.

While reported cases are still on the rise for certain cancers, increased vigilance and advanced treatment protocols have vastly increased the survivability of most cancers. Specifically, detection and treatment in the early stages have played a large role in surviving cancer.

Normally, we are constantly bombarded with any number of bacteria, viruses, and parasites. Internally, we have a standard number of abnormal cells that may, if left unchecked, ultimately manifest as cancer. Fortunately, our immune system is usually effective in fighting and destroying these invaders or rogue cells. Our bodies are battle grounds of sorts.

Fortunately....most of the time....our bodies are victorious; our immune system destroys the invaders or cancer cells and we go on with our daily lives.

When we get sick, however, it is most commonly the result of our immune system becoming overwhelmed. Either the invading virus, bacteria, parasite, or cancer cells proliferate at such a rapid rate that our immune response is unable to match the onslaught, or our standard immune response has been compromised/altere.....either by the invading cells/antigens themselves or by some other factor such as prolonged stress.

Craig Amrine L.Ac. is the owner and operator of Hidden Rhythm Acupuncture located in the heart of Tempe, Arizona. These monthly newsletters are designed to help educate the public on various afflictions that acupuncture as a part of Traditional Chinese Medicine is known to treat. Each month, Craig will address a new health challenge that commonly affects the general public and offer a brief explanation on each disease from both the Western perspective as well as from the Traditional Chinese Medical perspective. He will also offer his own thoughts on treatment based on personal clinical observation and treatment experience.



Conventional therapies for fighting cancer including chemo-therapy that are designed to kill very rapidly dividing cells...such as cancer cells. The problem however, is that chemo-therapy is not too specific and will also target virtually ANY rapidly dividing cells including both white and red blood cells as well as hair follicles. Ironically, this can lead to lowering the immune system and thus lead to a large host of other health-risks.

**Cancer Treatments:** Treatment and prevention of cancer, be it through conventional as well as non-conventional treatments is a HUGE topic. There are medical doctors, oncologists, naturopaths, and experts of Traditional Chinese Medicine who spend their entire careers on this. Entire medical journals are dedicated to new breakthroughs in cancer treatment. One such technique involves regional hyperthermia to treat local neoplasms. The thought is that heating a tumor up to 113 F will kill cancer cells but leave healthy cells relatively intact. This is often combined with radiation and/or chemotherapy. For this article however, we will simply talk about the role of acupuncture in this battle.

So, where does acupuncture fit in? Can acupuncture help in the fight against cancer and other diseases? Before we discuss that, listed below is a (very) brief list of some of our cells that are involved in our immune system<sup>6</sup>

## WHITE BLOOD CELLS

### Granulocytes

Neutrophils = Most abundant type of white blood cell. Become phagocytic when encountering infectious materials; meaning they eat foreign, infected, or dying cells.

Eosinophils = Weakly phagocytic.. Very effective against parasites (worms). Ingest antigen/antibody combinations. They also moderate histamine induced allergy and inflammatory responses.

Basophils = They release histamine, an enzyme that is triggered by cell damage.

Histamine is responsible for increasing blood flow to a target area, increasing permeability of blood vessels to promote fluid to flow from blood vessels to surrounding tissue spaces resulting in swelling. It is secreted by basophils, mast cells and platelets and is responsible for much of our undesirable allergy symptoms left unchecked.

Natural Killer Cells (NK) = These cells directly attack and kill infected and cancer / tumor cells. They don't have to rely on any prior "conference" or anti-body based reactions, although they do respond to "some" instructions from other immune cells. They are considered the "shock-troops" of this defensive battle.

## Agranulocytes

Phagocytes = derived from monocytes, a type of white blood cell... wander through connective tissue. You have “free” macrophages that include dendritic cells of epidermis and alveolar cells of lungs search for cellular debris or foreign invaders. You also have “fixed” macrophages such as Kupffer cells (liver) and microglia (brain)

Lymphocytes = Responsible for developing cell immunities.

T Lymphocytes = These cells can either directly kill certain tumor or virally infected cells (CD8+ or “cytotoxic” version) or they can secrete factors that activate other white blood cells (CD4+ or “helper” version). There are several other subtypes of T-lymphocytes that I didn't include in order to keep this article at a reasonable a length.

B Cells = The main function of these cells is to secrete antibodies; specific markers for one particular antigen. These antibodies serve as markers to trigger other types white blood cells to attack and kill it.

Cytokines = Proteins secreted by various white-blood cells that act as messengers and mediators during the immune response. They are often responsible for both enhancing or modulation inflammation, fever, and immune responses led by white-blood cells. There are SEVERAL sub-types of cytokines including Interleukins (IL-1, IL-2 subfamily, IL-10 subfamily), Interferon (IFN), lymphokines.

The overall immune response mechanism (both cell-mediated and humoral immunity) is an ingenious and complex dance that involves all of these cell types listed above as well as several other cells and processes designed to provide an effective but regulated defense against bacteria, viruses, parasites, and cancer. Imbalance in this process can lead to, on one extreme, a weak immune system where we are left vulnerable to any external or internal invader. On the other extreme, imbalance can lead to a situation where the immune system is too active and will attack healthy body tissue and undigested proteins as characterized by several types of auto-immune disorders.

What can acupuncture do? Can acupuncture actually affect the number of leukocytes and cytokines responsible for our immune system? The answer is without a doubt YES!

### **Acupuncture and Immune Cells: A brief literature review**

Several studies were conducted on both healthy adults as well as adults afflicted with malignant tumors. Blood analysis was taken on both control groups as well as groups treated with acupuncture. In some of the studies, acupuncture was conducted several times, in other studies, acupuncture was performed just once.

The first study<sup>1</sup> showed how a single acupuncture session treated at various points showed show no changes on relative amounts of certain lymphocytes but also showed statistically significant increases in several types of cytokines, interferon, and NK-cells. The temporary increase returned to normal levels, however, after about 30 days. While this study provided detailed blood analysis of its subjects before and for several intervals after the acupuncture treatment, it lacked important details that could have provided even more powerful conclusions such as a “control” group or a “sham” group where patients were treated with acupuncture points NOT designed for boosting immune function.

Another study<sup>2</sup> compared T-lymphocytes showed how acupuncture treatments on patients with malignant tumors showed statistically significantly increases in T-lymphocyte subsets OKT3+, OKT4+, OKT8+.

A third study<sup>3</sup> investigated levels of T-lymphocytes subgroups (CD3+, CD4+, CD8+), soluble interleukin-2 receptor (SIL-2R) and beta-endorphin in the peripheral blood of patients with malignant tumors. Half of the group received NO acupuncture (control Group). The other group received daily acupuncture treatments for 10 days (treatment group). After 10 daily acupuncture treatments, remarkably significant increases in peripheral blood plasma levels of CD3+, CD4+, CD8+, and beta-endorphin were noted. Interestingly, a remarkable decrease in levels of SIL-2R was measured. No changes were noted in the untreated (control) group. Serum sIL-2R level is a sensitive marker of circulating peripheral blood mononuclear cell activation or specific tumor cell growth including non-Hodgkin's lymphoma (NHL)<sup>4</sup>. In other words, lower levels of SIL-2R is a good thing. Studies suggest that lower levels of SIL-2R indicate increase chance of surviving certain types of cancer.

The final reference I want to mention is actually a wonderfully written paper that references several studies examining the effect of acupuncture on levels of NK (natural killer cells)<sup>5</sup>. Within this paper, one study examined cytotoxicity levels of NK cells in both healthy women as well as a group of women with high levels of anxiety. Interestingly, the women with chronic anxiety showed 3-fold lower NK cell activity than those with no reported anxiety. After 10 acupuncture treatments however, the anxious women showed a full restoration of NK-cell activity up to normal levels!

An interesting observation is how both presence of malignant tumors AND stressed emotional states (anxiety) have been shown to lower the levels of immunity enhancing cell activity such as NK-cells. Remarkably, acupuncture treatments have consistently been shown to counteract the negative impact of emotional (anxiety) and physical (cancer) states on the immune-cell quantities and function.

This paper further references several other studies highlighting how acupuncture treatments (most often referencing acupuncture point zusanli) have shown remarkable increases in NK-cells, Interferon-gamma, and interleukine-2 (IL-2). Some of these studies do, in fact, utilize “sham” points and control groups to further strengthen the

argument that specific acupuncture points are directly responsible for these increases in immune function

These studies provide an overwhelming body of evidence that acupuncture does have a strong effect in enhancing immune-cell function in the body, even in those with immunocompromised conditions.

### **What does this mean to my health?**

Now, the big question is: Does acupuncture shrink tumors? Does it prevent cancer? Does it prevent infectious diseases like the flu? The common cold? As of yet, I haven't been able to find any studies specifically measure the tumor reducing effects of acupuncture. That doesn't mean they don't exist, it just means I've been unable to find them. But, we can safely conclude that acupuncture can affect our immune system in a "positive" way. It can be used as another weapon in our fight against disease and cancer, both as a preventative as well as an adjunctive therapy for current cancer treatments. I can also say with confidence that patients who see me on a regular acupuncture schedule will claim to get far fewer colds and flus during their course of treatments. They also seem to recover much faster and suffer far fewer symptoms flu-like symptoms including fever, aches, and sinus congestion.

Stay tuned for the follow-up article to understand how immune function, cancer, and infectious diseases (such as influenza) are viewed from a Traditional Chinese Medical perspective.

---

#### *Sources:*

- 1) Nobuo Yamaguchi et. al. **Acupuncture Regulates Leukocyte Subpopulations in Human Peripheral Blood**, *Department of Fundamental Research for Complementary and Alternative Medicine, University of Oriental Medicine, Kyoto, Japan, eCAM 2007;4(4)447-453*
- 2) Yuan J, Zhou R., **Effect of acupuncture on T-lymphocyte and its subsets from the peripheral blood of patients with malignant neoplasm** [Article in Chinese] *Zhen Ci Yan Jiu. 1993;18(3):174-7.*
- 3) Wu, B. "Effect of Acupuncture on the Regulation of Cell-Mediated Immunity in Patients With Malignant Tumors." *Chen Tzu Yen Chiu. 1995. 20(3):67-7*
- 4) Kono N, Kanda Y, Yamamoto R, Chizuka A, Suguro M, Hamaki T, Arai C, Matsuyama I, Takezako N, Miwa A, Togawa A. **Prognostic significance of serum soluble interleukin-2 receptor level in non-Hodgkin's lymphoma: a single center study in Japan.** Department of Hematology, International Medical Center of Japan, Tokyo. *Leuk Lymphoma. 2000 Mar;37(1-2):151-6.*

5) Michael Francis Johnston<sup>1</sup>, Elizabeth Ortiz Sánchez<sup>2</sup>, Nikola L. Vujanovic<sup>3,\*</sup> and Wenhui Li<sup>4,\*</sup> **Acupuncture May Stimulate Anticancer Immunity via Activation of Natural Killer Cells.** <sup>1</sup>Department of Medicine, University of California, <sup>2</sup>Division of Surgical Oncology, Department of Surgery, University of California, Los Angeles, CA, <sup>3</sup>University of Pittsburgh Cancer Institute, Departments of Pathology and Immunology, University of Pittsburgh, Pittsburgh, PA and <sup>4</sup>Department of Chemistry, University of California, Los Angeles, CA, USA, eCAM Advance Access published online on February 1, 2010

6) <http://uhaweb.hartford.edu/bugl/immune.htm#adapt>