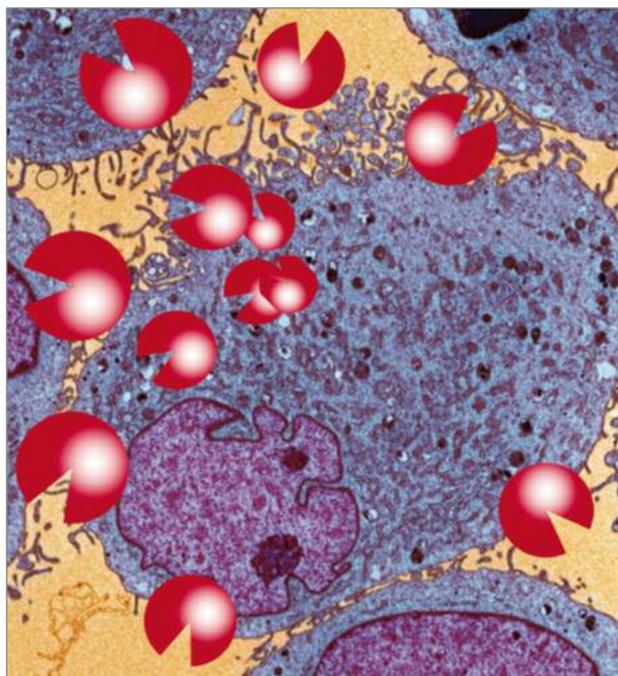


# Superiority of Micronutrient Synergy in Leukemia

Leukemia is a cancer of the bone marrow, which produces blood cells. Patients with leukemia experience an excessive production of white blood cells (WBCs), also known as leukocytes. It is the tenth most commonly diagnosed cancer in the US and the most common cancer in children. In the US, approximately 52,380 people are expected to be diagnosed with leukemia in 2014. The numbers are equally staggering in Europe with 82,329 cases. Asia reported 167,448 cases of leukemia in 2012. Leukemias are largely divided into acute (rapidly progressing), chronic (slower progression), myeloid, and lymphoid types, depending on the kind of cells affected (AML, ALL, CML, CLL). The most common type of leukemia in children is ALL; in adults it is AML, CML and CLL.



*Leukemia cells under a highly magnifying electron microscope. The continuous secretion of collagen-digesting enzymes is illustrated by red "pacmen". For more information on this process, please refer to the book "Victory Over Cancer".*

Possible causes for leukemia include: exposure to ionizing radiation (medical radiation through X-rays, CT scans, radiotherapy and environmental exposure); viruses such as human T-lymphotrophic virus (HTLV-1) and HIV; exposure to benzene (through tobacco smoke and automobile pollution); exposure to chemicals in hair dyes; chemotherapy drugs used in prior cancer treatments; and some genetic abnormalities such as Down's syndrome.

Despite a number of treatment options available, and depending on the type of leukemia, the average 5-year survival rate is only 50-60%. More than 90% of cancer deaths are due to the spread of the cancer. Leukemia patients die from the failure of various "filter" organs such as the spleen and liver. This organ failure results from excessive production of collagen digesting enzymes – matrix metalloproteinases (MMPs) – by leukemia cells that literally "digest" these organs from within.

We studied the effects of different individual micronutrients, as well as their specific combination, on HTLV-1 dependent leukemia cells. We demonstrated that, when used alone, vitamin C was able to reduce the cancerous cell growth and induce cell death by modifying the activity of cancer promoting specific genes<sup>1</sup>. Lysine was able to reduce the secretion and activity of MMP enzymes in HTLV-1 induced leukemia cells<sup>2</sup>. Similarly, green tea extract could trigger cell death and reduce the destructive actions of MMP enzymes<sup>3</sup>.

In our latest study<sup>4</sup> we tested a combination of vitamin C, lysine, proline, green tea extract, arginine and other micronutrients in leukemia. This combination was markedly more effective than its individual ingredients and, even at its lowest used concentration, showed its inhibitory effect on the MMPs at key cellular levels: their production, secretion, and activity. The inhibition of MMP enzymes reached almost 100% at maximum micronutrient concentration.

Currently, more than 30 drugs are available for the treatment of leukemia. Since November 2013, the US Food and Drug Administration has approved three anti-leukemic drugs. Nevertheless, one person in the US dies from a blood cancer approximately every 10 minutes. Our research proves that this combination of safe and effective micronutrients is successful in modifying all aspects of leukemia and should therefore be considered by blood cancer patients worldwide.

1. Harakeh S, et al, *Anticancer Res.* 2007 Jan-Feb;27(1A):289-98.
2. Harakeh S, et al, *Chem Biol Interact.* 2006 Dec 1;164(1-2):102-14.
3. Harakeh S, et al, *Asian Pac J Cancer Prev.* 2014;15(3):1219-25.
4. Harakeh S, et al, *Int J Oncol.* 2014 Nov;45(5):2159-66. Epub 2014 Sep 3.

## Health Science News Page



This information is provided to you courtesy of the Dr. Rath Research Institute. Led by two former colleagues of two-time Nobel Laureate Linus Pauling († 1994) this Institute has become a leader in the breakthrough of natural health research in the field of cancer, cardiovascular disease and other common diseases. The Institute is a 100% subsidiary of the non-profit Dr. Rath Foundation.

The groundbreaking nature of this research poses a threat to the multi-billion dollar pharmaceutical "business with disease." It is no surprise that over the years the drug lobby has attacked Dr. Rath and his research team in an attempt to silence this message. To no avail. During this battle, Dr. Rath has become an internationally renowned advocate for natural health saying, "Never in the history of medicine have researchers been so ferociously attacked for their discoveries. It reminds us that health is not given to us voluntarily, but we need to fight for it."

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