

MGN-3

Human immune function is under constant attack from an increasingly toxic environment, as bacteria, viruses and other pathogens seek hold in the body. Researchers in the field have explored a range of natural and pharmaceutical compounds designed to strengthen immune response, paying particular attention to the functioning of white blood cells such as T cells, B cells and natural killer (NK) cells. One such product is MGN-3™ (an arabinoxylane compound) that is a polysaccharide composed of the hemicellulose-Beta extract of rice bran, modified by enzymes from Shiitake mushrooms.

MGN-3 was first manufactured in Japan and has been available there for almost a decade. It is manufactured by Daiwa Pharmaceutical Co. and exclusively sold in the United States by Lane Labs-USA Inc. Mamdooh Ghoneum, Ph.D., associate professor and chief of research in the Department of Otolaryngology at Charles D. Drew University, is the leading researcher on the immunostimulatory effects of MGN-3 in conditions ranging from viral infection to cancer.

To understand how MGN-3 works in the body, it is important to review the functioning of NK cells. NK cells are one of the most common white blood cells, representing up to 15 percent of total white blood cells. They work independently from the immune system, identifying and attacking any foreign cells in the body. As such, they are considered the body's first line of defense against pathogens and mutations.

The number of NK cells is not as important as their activity in the body--the rate at which they recognize and bind to foreign cells. Thus, most immunomodulators do not increase the number or percentage of NK cells, but increase the level of activation. Studies have shown that in healthy immuno-competent individuals, NK cell activity measured at an effector-to-target ratio of 100-to-1, ranges between 60 percent and 75 percent. In cancer patients, NK cell activity ranges from near 0 to 30 percent.¹

Ghoneum has conducted many studies examining MGN-3's ability to stimulate NK cell activity in cancer patients. Three such studies involved a total of 32 cancer patients with different types of advanced malignancies.^{2,3,4} The patients had received and completed conventional therapy such as surgery, chemotherapy, radiation or hormonal therapy prior to participation in the study. Baseline NK activity ranged between 10.8 percent and 49 percent. Oral ingestion of MGN-3 at 45 mg/kg/d led to a significant increase in NK cell activity after two weeks. Increases ranged from 145 percent to 332 percent in breast cancer patients, 174 percent to 385 percent in prostate cancer patients, 100 percent to 240 percent in leukemia patients, and 100 percent to 537 percent in multiple myeloma patients.

The mode of action of MGN-3 on NK cells is still being investigated. One in vitro study Ghoneum conducted indicated a dose-dependent relationship between MGN-3 and induction of tumor necrosis factor-alpha (TNF-alpha) and interferon-gamma (IFN-gamma).⁵ Another study by Ghoneum found that activated NK cells produce a variety of cytokines with direct antiviral and anti-cancer activities, as well as activation of T cells and B cells.⁶

Ghoneum noted that MGN-3 is not a replacement for traditional "debulking" therapies, such as radiation, chemotherapy and surgery, which are designed to eliminate most of the cancer cells. "Even an extremely active immune response is easily overwhelmed by the huge numbers of cancer cells present," Ghoneum wrote in *The Townsend Letter*.⁷ "Instead, we recommend that cancer patients with solid tumors begin MGN-3 immunotherapy concurrent with or immediately following debulking therapies. With this strategy we have the best chance of winning what essentially becomes a war of numbers."

The benefits of MGN-3 are not limited to targeting cancer cells. "In addition to very encouraging results using MGN-3 in the treatment of malignancies, other research suggests a promising role for MGN-3 as a therapy for HIV, hepatitis C and other viral infections," Ghoneum wrote in *The Townsend Letter*.⁸ "MGN-3 has antiviral

activity and also enhances the body's immune response against virally infected cells. In vitro research shows that MGN-3 inhibits replication of the HIV virus without cytotoxicity in a dose-dependent manner."

The in vitro study on MGN-3 and HIV showed that MGN-3 inhibited HIV-1 replication by inhibiting antigen production and syncytia formation.⁹ It also showed MGN-3 increased T and B cell mitogen response at two months after treatment. "MGN-3 possesses potent anti-HIV activity and, in the absence of any notable side effects, MGN-3 shows promise as an agent for treating patients with AIDS," Ghoneum wrote in The Townsend Letter.

Another researcher investigated how MGN-3 might affect patients with chronic fatigue syndrome. Julian Kenyon, M.D., reported results in The Townsend Letter from a study of 10 patients at his Southampton, England, clinic taking MGN-3 for two months.¹⁰ While only four of the 10 patients improved, all four were the ones with clear viral etiologies behind their chronic fatigue diagnosis. Further, no abnormalities in NK cell activity were observed. He concluded, "In those patients with a clear viral etiology of chronic fatigue syndrome, [MGN-3] produced significant improvement. This improvement persisted for approximately six weeks following stopping [treatment]."

Ghoneum concluded in The Townsend Letter, "MGN-3 is a powerful biological response modifier that is free of toxicity or side effects. As such it has enormous promise as an immunotherapy."

References

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