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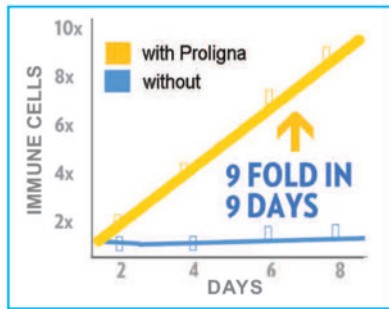


**SUPPORT FOR
BONE AND
JOINT HEALTH**

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Benefits of pine cone extract were first documented in 500 A.D. by Greek physicians, and has been used in Japan for hundreds of years for health and longevity. And in 20 years of rigorous scientific studies, it has been shown to have a positive, lasting effect on immune cell activity.

*Immune Extra—
like a vitamin
for your immune
system.*



- Clinically proven safe
- GMP manufactured in the USA from renewable ingredients
- Vegan formula-no animal products



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The Immunity Benefits of Pinecone Extract (PPC)

By Frank Tufaro, PhD, president and CEO of Allera Health Products, Inc.

Pinecone extract, also called PPC, is a natural polyphenolic mixture of lignins complexed with polysaccharides.¹ Lignin is the second most abundant organic polymer on earth and is an important component of plants and algae. Lignin is naturally cross-linked to polysaccharides, which in pinecone extract are primarily mannose, fucose, arabinose, galactose and glucose.²

Proligna® brand pinecone extract, distributed by Allera Health Products as Immune Extra®, is made by immersing young, clean pinecones in hot water at a high pH to tease apart the lignin-polysaccharide molecules and release them into the water in a bioactive form. The liquid extract is then dried (using no chemicals) and encapsulated into vegetarian capsules. Pinecone extract is extremely stable, and is not easily degraded by heat, acids, bases or enzymes. The extract can be stored indefinitely at room temperature.³

Pinecone extract has a medicinal history that dates back to the Greek physician Dioscorides (40-90 A.D.), and has been used for over 100 years in Japan for a variety of medical conditions. The advent of modern molecular immunology in the 1980's prompted scientists to investigate the biological properties of PPC, which resulted in more than 30 scientific publications. Dr. Sakagami provides an excellent review of this early work.⁴

Safety Testing

The safety and tolerability of PPC administered orally has been examined in human clinical studies.⁵ PPC (Immune Extra by Allera Health Products) was evaluated in a double-blind, placebo-controlled study of 46 human subjects at three US medical centers. After several months of daily ingestion of 16-96mg of Immune Extra (one to six capsules), no significant differences were observed in the blood chemistry or other safety parameters tested compared to the placebo group. These results suggest that long-term use of pinecone extract is well tolerated and does not cause significant toxicity or side effects.

Effects of PPC on Human Blood Cells

Dendritic cells (DCs) are the most potent antigen-presenting cells of the immune system⁷ and play an important role in anti-cancer host immune responses as well as immune tolerance and autoimmunity. Bradley et al.⁶ demonstrated that incubation of human blood cells called monocytes with PPC causes the monocytes to differentiate into cells resembling DCs with high efficiency. These results are remarkable because monocytes usually require incubation with two human cytokines called granulocyte-macrophage colony-stimulating factor (GM-CSF) and interleukin 4 (IL-4) to differentiate into DCs.⁷⁻⁸ These results suggest that PPC might be a useful agent for efficiently making dendritic cells for cancer immunotherapy. Although it is not known whether PPC stimulates dendritic cell formation after ingestion, the fact that PPC exhibits potent cytokine-like activity is intriguing and warrants further investigation.

IgE and Allergy

Immunoglobulin E (IgE) is a class of antibody that plays an important role in allergy. IgE-mediated allergies affect more than 50 million people in the United States and represent a huge burden on the health care system. Since numerous studies have demonstrated a strong correlation between the reduction of serum IgE levels and noticeable improvement in the well being of people suffering from most allergies, Burrows et al.³ investigated the effects of PPC on IgE production, cytokine balance and antigen-specific cytotoxic T cell response. The results showed that



oral administration of PPC reduces serum IgE levels in mice and significantly suppresses an IgE response. Significantly, this activity appears to be associated with an enhancement of a Th1-associated cellular immune response, suggesting that PPC in some way rebalances the immune system toward Th1 immunity.

Future Directions

Collectively, these studies suggest that pinecone extract is well tolerated and possesses potent biological characteristics that affect the immune system. Future studies to define the dosage and timing to reduce allergy or to promote disease-fighting would be necessary before pinecone extract can be used as a prescription drug for the treatment of disease. Pinecone extract is nonetheless an important, ancient compound that is used today for maintaining health and wellness.

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