

## Peer Reviewed Study from Louisiana State University, "Protandim®, a Fundamentally New Antioxidant Approach in Chemoprevention Using Mouse Two-Stage Skin Carcinogenesis as a Model," Published in PLoS ONE Journal

[LifeVantage Corporation](http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005284) (OTCBB:LFVN) announced today the findings from a Louisiana State University peer-reviewed study were published this week in the journal *PLoS ONE*, an international, peer-reviewed, open-access journal published by the Public Library of Science. The abstract from the study, conducted by Dr. Yunfeng Zhao and his colleagues at the Louisiana State University Health Sciences Center in Shreveport, LA, is presented below. The entire study can be found at: [www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005284](http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005284).

### **Abstract: Protandim, a Fundamentally New Antioxidant Approach in Chemoprevention Using Mouse Two-Stage Skin Carcinogenesis as a Model**

Jianfeng Liu, Xin Gu, Delira Robbins, Guohong Li, Runhua Shi, Joe M. McCord, Yunfeng Zhao

Oxidative stress is an important contributor to cancer development. Consistent with that, antioxidant enzymes have been demonstrated to suppress tumorigenesis when being elevated both in vitro and in vivo, making induction of these enzymes a more potent approach for cancer prevention. Protandim, a well-defined combination of widely studied medicinal plants, has been shown to induce superoxide dismutase (SOD) and catalase activities and reduce superoxide generation and lipid peroxidation in healthy human subjects. To investigate whether Protandim can suppress tumor formation by a dietary approach, a two-stage mouse skin carcinogenesis study was performed. At the end of the study, the mice on a Protandim containing basal diet had similar body weight compared with those on the basal diet, which indicated no overt toxicity by Protandim. After three weeks on the diets, there was a significant increase in the expression levels of SOD and catalase, in addition to the increases in SOD activities. Importantly, at the end of the carcinogenesis study, both skin tumor incidence and multiplicity were reduced in the mice on the Protandim diet by 33% and 57% respectively, compared with those on basal diet. Biochemical and histological studies revealed that the Protandim diet suppressed tumor promoter-induced oxidative stress (evidenced by reduction of protein carbonyl levels), cell proliferation (evidenced by reduction of skin hyperplasia and suppression of PKC/JNK/Jun pathway), and inflammation (evidenced by reduction of ICAM-1/VCAM-1 expression, NF- $\kappa$ B binding activity, and nuclear p65/p50 levels). Overall, induction of antioxidant enzymes by Protandim may serve as a practical and potent approach for cancer prevention.

Additional findings of a related, extended study were presented earlier this week at the 100<sup>th</sup> annual meeting of the *American Association for Cancer Research* in Denver, CO. The abstract for that study, titled "*The effects of a novel antioxidant diet (Protandim) on cell death during early skin carcinogenesis*," is set forth below.

### **Abstract: The effects of a novel antioxidant diet (Protandim) on cell death during early skin carcinogenesis**

Delira Robbins, Jianfeng Liu, Amos Sit, Xin Gu, Yunfeng Zhao

Department of Pharmacology, LSU Health Sciences Center, Shreveport, LA 71130

Protandim is a combination of 5 well-studied medicinal plants that induce superoxide dismutase and other antioxidant enzymes. The synergistic induction of endogenous antioxidant enzymes is a unique property of Protandim, and has been shown to be highly effective in decreasing oxidative stress at low, non-toxic concentrations. Utilizing the multistage skin carcinogenesis model, we investigated the molecular mechanisms used by Protandim to exert its anti-cancer effects. Our preliminary studies demonstrated that Protandim, via dietary administration, suppressed oxidative stress and skin tumor formation. In addition, previous studies using the multistage skin carcinogenesis mouse model demonstrated that cell proliferation was accompanied by apoptosis and apoptosis preceded cell proliferation. Therefore, we hypothesize that oxidative stress, cell proliferation and p53-mediated apoptosis forms a positive feedback loop, which plays a major role in contributing to tumorigenesis. Thus, the induction of SOD by Protandim could break this feedback cycle, leading to cancer prevention.

Our preliminary studies have demonstrated that TPA induces a significant increase in p53 expression in both the cytoplasmic and mitochondrial fractions of mouse skin tissue. Further studies revealed that Protandim suppressed these increases. In addition, we analyzed mitochondrial Bax expression via Western Blot analysis. Nevertheless, Protandim significantly reduced Bax expression in the mitochondrial fraction of mouse skin tissue treated with DMBA/TPA. These results indicated that Protandim played an important role in modulating apoptotic cell death. Our results were consistent with data generated from the skin epidermal JB6 (CL41, P+) in vitro model. These results give insight into the role of Protandim in modulating oxidative stress, p53-mediated apoptosis and cell proliferation.

## About LifeVantage Corporation

LifeVantage Corporation is a publicly traded (OTCBB:LFVN), science based, dietary supplement company, dedicated to helping people reach their health and wellness goals through science-based solutions that deliver significant health benefits to consumers. Protandim is not marketed by LifeVantage Corporation as a drug and is not intended to prevent, mitigate, treat or cure any disease, including cancer. For more information, visit [www.LifeVantage.com](http://www.LifeVantage.com) or contact Jan Strode (619) 890-4040 or Jean Golden (612) 385-2324.

*This document contains forward-looking statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. The Company uses the words "anticipate," "believe," "could," "should," "estimate," "expect," "intend," "may," "predict," "project," "plan," "target" and similar terms and phrases, including references to assumptions, to identify forward-looking statements. These forward-looking statements are based on the Company's current expectations and beliefs concerning future events affecting the Company and involve known and unknown risks and uncertainties that may cause the Company's actual results or outcomes to be materially different from those anticipated and discussed herein. These risks and uncertainties include, among others, the risk that government regulators and regulations could adversely affect our business; future laws or regulations may hinder or prohibit the production or sale of our existing product and any future products; unfavorable publicity could materially hurt our business; and the Company's ability to protect our intellectual property rights and the value of our product. These and other risk factors are discussed in greater detail in the Company's Annual Report on Form 10-KSB under the caption "Risk Factors", and in other documents filed by the Company from time to time with the Securities and Exchange Commission. The Company cautions investors not to place undue reliance on the forward-looking statements contained in this document. All forward-looking statements are based on information currently available to the Company on the date hereof, and the Company undertakes no obligation to revise or update these forward-looking statements to reflect events or circumstances after the date of this document, except as required by law.*

*\*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.*

Note to Editors: Contact Jan Strode at 619-890-4040 or Jean Golden at 612-385-2324, LifeVantage Corporation representatives, for interviews, photography, and other requests.

LifeVantage Corporation  
Jan Strode, 619-890-4040  
Jean Golden, 612-385-2324