Driving Improved ROI from Employers' Health Care Spend

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Satisfaction on the Job

- **Fact: Nationwide, 63% of workers are unhappy in their jobs and 52% of workers are not engaged.**
- 74% of the workforce is experiencing a personal energy crisis (burnout)
- **Recent surveys suggest a strong link between a company culture rooted in employee well-being and important organizational outcomes such as productivity, health, and employee retention.**

Did you Realize?

- 120,000 deaths per year maybe due to an accumulation of stressors in the workplace
  - Long hours, lack of job security, perceptions of unfairness in the workplace, and a perceived lack of control.
  - $125-190 billion in annual estimated health care costs due to stress in the workplace
- 78% of leaders agree that this is their top concern, but only 15% of organizations are actually taking measures to address the issue.

Solution – Workplace Wellness?

- **What is Workplace Wellness?**

- Workplace wellness is an employer-sponsored program for promoting long-term employee health and reducing total insurance spend.

The Big Question ?

Are Wellness Programs worth it?

Wellness Programs - Value

- 22 different studies looked at wellness programs and healthcare costs. The average return on investment was $3.27 for every dollar spent.

Making Wellness A Way Of Life At Work

- University Health Alliance(UHA) is an Employer Group Health Plan in Hawaii that was recognized by the CDC for their work – they practice what they preach.
- UHA says that "Employers seem to be interested in focusing in on Mental Health Wellness and Wellness for the new Workforce, Millennials" in their organizations.
  - Mental Health Wellness: UHA employees have organized hula classes, hikes, walks to nearby farmers' markets, basketball games, Bible study groups, and even coloring in adult coloring books to reduce stress.
  - Wellness for the new workforce, millennials: also includes flexible time, remote work space)
  - ESPN RADIO in Hawaii brings in a Masseuse providing 30 minute shoulder, neck, back massages weekly and has been a Wellness benefit for 7 years now.

Energy, Resilience, and Thriving in the Workplace:

Managing Stress and Burnout

Molly Washburn

Wellness Coaching

- A coach will help you develop **personalized strategies, action plans and health-enhancing behaviors** to support your goals.
- Your coach's **support, education, accountability, encouragement,** and their positive approach to **identifying your strengths and motivation** can help you reach a new level of energy and resilience that can be life-changing.
- People who engage in coaching achieve much **higher levels of improvement** (very often 5X to 10X higher) in health related behavioral changes than those not coached.
    - Coaching produces higher levels of improvement in employee population well-being than any other method.

Meditation & Mindfulness

- It's Time to Stop Surviving and begin Thriving...one mindful breath at a time
- Ell Graniel - Founder of Truespeak "Because the Truth is in You"
- Certified Life Coach - International Academy of Self-Knowledge
- B.A. Business Communication
- Certified Fitness Professional and CEC provider (AFAA & NASM)
- Author - Chocolate Cake for the Thighs - the anti diet book for women

WELLNESS & LIFE COACHING

- WHY MINDFULNESS MATTERS
- Mindful Breathing - 2018 studies
- "Calms and relaxes the mind" Dr. Andrew Weil
- "Muscle Relaxation with the breath reduces stress" WebMD
- "Breath Control helps quell errant stress response" health.Harvard.edu
- "How Meditaion Helped Save the Tai Soccer Team Trapped in a Cave" Washington Post
- And if you weren't sold on the power of meditation before, just think: If mindfulness can get people through 10 days of being trapped in a flooded cave, then imagine what it can do for the smaller, everyday stressors in work/life.

New Idea: Managing Chronic Inflammation

What is Chronic Inflammation

Chronic inflammation happens when acute, normal inflammation lingers, leaving your body in a constant state of alert.

Chronic inflammation is linked to the development of major diseases, including:

- Cancer
- Heart disease
- Rheumatoid arthritis
- Type 2 diabetes
- Obesity
- Asthma
- Neurodegenerative diseases ssuch as Alzhemer's

Managing Chronic Inflammation

PHYSICIANS AGREE:

The key to health and longevity is

INFLAMMATORY HEALTH

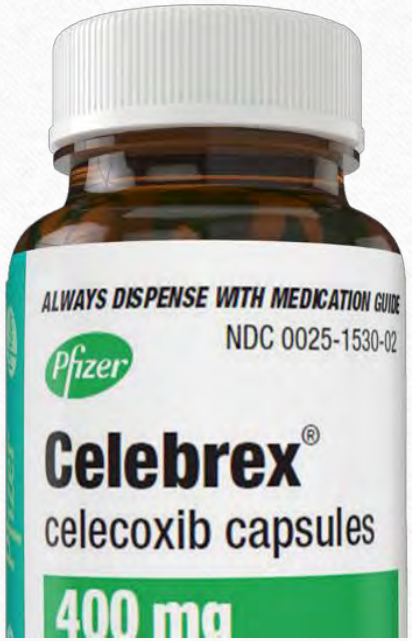
Managing Chronic Inflammation

Important New Example

10,061 Patient CANTOS Trial

- Cardiovascular patients on standard of care (including statins)
- No change in lipids
- If inflammation (as measured by CRP) was reduced:
  - **25% REDUCTION IN MIs, STROKES**
  - **31% REDUCTION IN CV DEATH & ALL-CAUSE MORTALITY!**

Why not manage inflammatory health with other leading anti-inflammatories?



Because of the risk of dangerous

SIDE EFFECTS

associated with chronic use

- HEART ATTACKS
- GI BLEEDS
- STROKES
- LIVER DAMAGE
- IMMUNE COMPROMISE

and more...

There’s NO anti-inflammatory that’s safe for

CHRONIC USE

UNTIL NOW

Managing Inflammation

ASTAXANTHIN

- a safe anti-inflammatory for health and longevity

Managing Inflammation

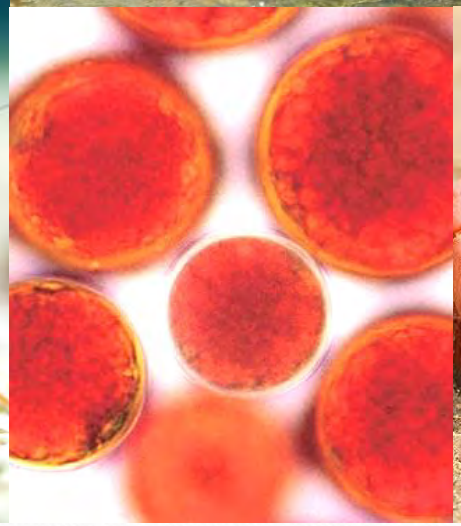
WHAT IS ASTAXANTHIN?

WHAT IS ASTAXANTHIN?

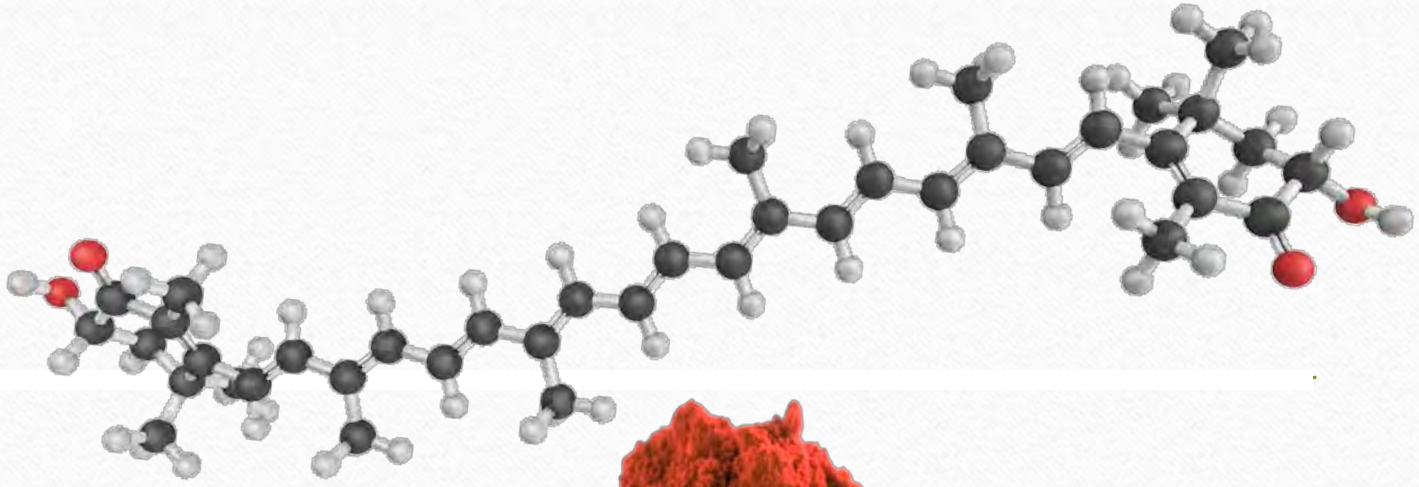
Astaxanthin is a **naturally occurring marine carotenoid** found in salmon, microalgae, krill, lobster, and crab.

Carotenoids are natural pigments that impart coloration and support animal health and vitality.

Astaxanthin is responsible for turning salmon and shellfish pink.



ASTAXANTHIN SAFETY



No significant side effects have been reported in published human studies of astaxanthin

- FDA ***GRAS*** (Generally Recognized as Safe) designation
- Extensive safety testing
- Long history of use in humans and animals

ASTAXANTHIN EFFICACY

Potent anti-inflammatory activity

- **1,600+ peer reviewed papers**
  More than 50 peer reviewed papers published by Cardax team members

- **50+ human clinical trials**
  20+ randomized, double blind, placebo controlled human POC

MODERN RHEUMATOLOGY

ORIGINAL ARTICLE

Astaxanthin ameliorates ca

Li-Juan Huang[1] and Wei-Ping Chen[2]

Abstract

Introduction

Astaxanthin: A Novel Potential Treatment for Oxidative Stress and Inflammation in Cardiovascular Disease

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Oxidative stress and inflammation are implicated in several different manifestations of cardiovascular disease (CVD). They are generated, in part, from the overproduction of reactive oxygen species (ROS) and reactive nitrogen species (RNS) that activate transcriptional messengers, such as nuclear factor–κB, tangibly contributing to endothelial dysfunction, the initiation and progression of atherosclerosis, irreversible damage after ischemic reperfusion, and even arrhythmia, such as atrial fibrillation. Despite this connection between oxidative stress and CVD, there are currently no recognized therapeutic interventions to address this important unmet need. Antioxidants that provide a broad, "upstream" approach via ROS/RNS quenching or free radical chain breaking seem an appropriate therapeutic option based on epidemiologic, dietary, and in vivo animal model data. However, human clinical trials with several different well-known agents, such as vitamin E and β-carotene, have been disappointing. Does this mean antioxidants as a class are ineffective, or rather that the "right" compound(s) have yet to be found, their mechanisms of action understood, and their appropriate targeting and dosages determined? A large class of potent naturally-occurring antioxidants exploited by nature—the oxygenated carotenoids (xanthophylls)—have demonstrated utility in their natural form but have eluded development as successful targeted therapeutic agents up to the present time. This article characterizes the mechanism by which this novel group of antioxidants function and reviews their preclinical development. Results from multiple species support the antioxidant/anti-inflammatory properties of the prototype compound, astaxanthin, establishing it as an appropriate candidate for development as a therapeutic agent for cardiovascular oxidative stress and inflammation. © 2008 Elsevier Inc. All rights reserved. (Am J Cardiol 2008;101[suppl]:58D–68D)

Atherosclerosis is an inflammatory disease of the arterial wall that remains a principal cause of death and disability, despite the application of statin and antiplatelet therapies. The severe clinical manifestations of the disease—myocardial infarction (MI) and stroke—are mainly caused by the abrupt obstruction of the vessel lumen by a thrombus triggered by the rupture or erosion of an atherosclerotic plaque.[1] Existing data strongly suggest that immunoinflammatory–related mechanisms are the major determinants of these atherothrombotic plaque sequelae.[2] Thus, most of the important advances in the comprehension of the mechanisms of atherothrombosis come from studies of the critical components involved in the modulation of the immunoinflammatory balance within the plaque. Despite an increasing understanding of these processes, there have been no approved therapeutic interventions in vascular biology that fully incorporate the current understanding of oxidative stress and inflammation.[3]

Role of Reactive Oxygen and Nitrogen Species in Cardiovascular Inflammation

Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are well recognized for functioning as both potentially harmful and beneficial cell-signaling molecules. Normally generated by tightly regulated enzymes, such as nicotinamide adenine dinucleotide phosphate oxidase (NADPH) and nitric oxide synthase (NOS), excessive and/or chronic overproduction of ROS/RNS either from the mitochondrial electron transport chain or various other ROS/RNS–generating enzymes, NADPH or NOS, results in oxidative stress, a harmful process that can be an important source of damage to cellular components, including lipids, proteins, and DNA. In contrast, beneficial effects of ROS/RNS (eg, superoxide radical and nitric oxide) occur transiently at low-to-moderate concentrations and mediate physiologic roles in cellular responses to oxygen deprivation: defense against infectious agents, modulation of cellular signaling pathways, and the induction of cellular proliferation. Paradoxically, various ROS-mediated actions, in

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Research

ates thrombosis in a mouse model

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BENDING THE COST CURVE
IMPROVING STANDARD OF CARE?

Reducing inflammation

in highest utilizers =

Cost Reduction

BENDING THE COST CURVE
IMPROVING STANDARD OF CARE?

Pharmaco- Economic Study of Astaxanthin in High Utilizers?

References

Joel Goh, Jeffrey Pfeffer, and Stefanos A. Zenios, "The Relationship Between Workplace Stressors and Mortality and Health Costs in the United States," Submitted to Management Science, manuscript MS-12-01264.R3 (2014).

The Energy Project website, accessed Nov 5, 2014, http://theenergyproject.com/?gclid=CMTcucG01sMCFYKUfgodWZMALg.

2013/2014 Staying@Work Survey Report

Hamblin, M, et al. (2018). Low-Level light therapy: Photobiomodulation. Society of Photo-Optical Instrumentation Engineers (SPIE).

Huffington, Arianna Stassinopoulos. Thrive. WH Allen, 2015.

Whitten, Ari. (2018). The Ultimate Guide to Red-Light Therapy. Archangel Ink.

Mercola, J., MD. (2018, January 5). #5: Incorporate the Nitric Oxide Dump. Retrieved from https://fitness.mercola.com/sites/fitness/archive/2018/01/05/four-minute-nitric-oxide-dump-workout.aspx#_edn16

Putnam, L. (2015). Workplace wellness that works: 10 steps to infuse well-being and vitality into any organization. Hoboken, NJ: John Wiley & Sons.

Mercola, J., MD. (2018, January 4). Better Than Any Blood Pressure Pill, I Highly Recommend This Daily Practice. Retrieved from https://articles.mercola.com/sites/articles/archive/2018/01/04/meditation-mind-body-benefits.aspx#_edn12

Whitten, A. (n.d.). Home. Retrieved from https://www.theenergyblueprint.com/

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