

Your AntiOxiDense™ Product Science – Fruit Phenolic Abstracts

{Note: the underlined sections within the text of the abstracts are highlighted for emphasis by us, not the authors}

(1)

[J Agric Food Chem.](#) 2008 Feb 13;56(3):636-41.

Berry fruit supplementation and the aging brain.

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The onset of age-related neurodegenerative diseases such as Alzheimer's or Parkinson's disease, superimposed on a declining nervous system, could exacerbate the motor and cognitive behavioral deficits that normally occur in senescence. In cases of severe deficits in memory or motor function, hospitalization and/or custodial care would be a likely outcome. This means that unless some way is found to reduce these age-related decrements in neuronal function, health-care costs will continue to rise exponentially. Thus, it is extremely important to explore methods to retard or reverse age-related neuronal deficits, as well as their subsequent behavioral manifestations, to increase healthy aging. In this regard, consumption of diets rich in antioxidants and anti-inflammatory polyphenolics, such as those found in fruits and vegetables, may lower the risk of developing age-related neurodegenerative diseases. Research suggests that the polyphenolic compounds found in berry fruits, such as blueberries and strawberries, may exert their beneficial effects either through their ability to lower oxidative stress and inflammation or directly by altering the signaling involved in neuronal communication, calcium buffering ability, neuroprotective stress shock proteins, plasticity, and stress signaling pathways. These interventions, in turn, may exert protection against age-related deficits in cognitive and motor function. The purpose of this paper is to discuss the benefits of these interventions in rodent models and to describe the putative molecular mechanisms involved in their benefits.

(2)

Natural Purple Pigments In Fruits, Vegetables And Berries, Such As Blueberries, May Help Prevent Obesity

ScienceDaily (Feb. 14, 2008) — Scientists in Arkansas are reporting new evidence that natural pigments responsible for the beautiful blue/purple/reddish color of certain fruits and vegetables may help prevent obesity. Their animal study however, reports that eating the whole fruit containing these pigments seems to be less effective than eating an extract of the berry.

Ronald L. Prior and colleagues, who did the new study, note that past research has shown that the pigments -- called anthocyanins -- prevent obesity in laboratory mice fed a high-fat diet. Anthocyanins are found in grape skins, blueberries, blackberries, purple corn, and other foods. The mice also had other healthful changes in disease-related substances found in the blood.

In the new study, researchers found that mice fed a high-fat diet for 8 weeks plus drinking water with purified anthocyanins from blueberries and strawberries gained less weight and had lower body fat levels than a control group. "Anthocyanins fed as the whole blueberry did not prevent and may have actually increased obesity," the study reported. "However, feeding purified anthocyanins from blueberries or strawberries reduced obesity."

The article "Whole Berries versus Berry Anthocyanins: Interactions with Dietary Fat Levels in the C57BL/6J Mouse Model of Obesity" is scheduled for the Feb. 13 issue of ACS' Journal of Agricultural and Food Chemistry.

American Chemical Society (2008, February 14). Natural Purple Pigments In Fruits, Vegetables And Berries, Such As Blueberries, May Help Prevent Obesity. *ScienceDaily*.

(3)

Consumption Of Fruits May Reduce Risk Of Alzheimer's Disease

ScienceDaily (Jan. 31, 2008) — Apples, bananas, and oranges are the most common fruits in both Western and Asian diets, and are important sources of vitamins, minerals, and fiber. A new study in the *Journal of Food Science* explores the additional health benefits of these fruits and reveals they also protect against neurodegenerative diseases, including Alzheimer's Disease.

Researchers at Cornell University investigated the effects of apple, banana, and orange extracts on neuron cells and found that the phenolic phytochemicals of the fruits prevented neurotoxicity on the cells.

Among the three fruits, apples contained the highest content of protective antioxidants, followed by bananas then oranges.

The authors concluded "[their] study demonstrated that antioxidants in the major fresh fruits consumed in the United States and Korea protected neuronal cells from oxidative stress....Additional consumption of fresh fruits such as apple, banana, and orange may be beneficial to improve effects in neurodegenerative diseases such as Alzheimer's."

Journal reference: H.J. Heo, S.J. Choi, S.-G. Choi, D.-H. Shin, J.M. Lee, C.Y. Lee. Effects of Banana, Orange, and Apple on Oxidative Stress-Induced Neurotoxicity in PC12 Cells. *Journal of Food Science* (OnlineEarly Articles). doi:10.1111/j.1750-3841.2007.00632.x

(4)

[Eur J Pharmacol.](#) 2008 May 13;585(2-3):325-37.

Health effects of quercetin: from antioxidant to nutraceutical.

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Quercetin, a member of the flavonoids family, is one of the most prominent dietary antioxidants. It is ubiquitously present in foods including vegetables, fruit, tea and wine as well as countless food supplements and is claimed to exert beneficial health effects. This includes protection against various diseases such as osteoporosis, certain forms of cancer, pulmonary and cardiovascular diseases but also against aging. Especially the ability of quercetin to scavenge highly reactive species such as peroxynitrite and the hydroxyl radical is suggested to be involved in these possible beneficial health effects. Consequently, numerous studies have been performed to gather scientific evidence for these beneficial health claims as well as data regarding the exact mechanism of action and possible toxicological aspects of this flavonoid. The purpose of this review is to evaluate these studies in order to elucidate the possible health-beneficial effects of the antioxidant quercetin. Firstly, the definitions as well as the most important aspects regarding free radicals, antioxidants and oxidative stress will be discussed as background information. Subsequently, the mechanism by which quercetin may operate as an antioxidant (tested in vitro) as well as the potential use of this antioxidant as a nutraceutical (tested both ex vivo and in vivo) will be discussed.

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[Ann Ist Super Sanita.](#) 2007;43(4):369-74.

Anthocyanins and heart health.

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Anthocyanins are the largest group of water-soluble pigments in the plant kingdom and belong to the family of compounds known as flavonoids. Major sources of anthocyanins are blueberries, cherries, raspberries, strawberries, black currants, purple grapes and red wine. In recent years several studies have shown that

anthocyanins display a wide range of biological activities including antioxidant, anti-inflammatory, antimicrobial and anti-carcinogenic activities. In addition they display a variety of effects on blood vessels, platelets and lipoproteins able to reduce the risk of coronary heart diseases. However, until the absorption and metabolic fate of anthocyanins in vivo is unravelled, it would be unwise to conclude that a high consumption of them will reduce the risk of chronic diseases. Long-term intervention trials must be properly designed and carried out to provide definite proof. In the meantime a more complete knowledge of the identity of anthocyanin metabolites and their tissue distribution should be reached.

(6)

[Mol Nutr Food Res.](#) 2007 Jun;51(6):675-83.

Berry anthocyanins as novel antioxidants in human health and disease prevention.

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Edible berries, a potential source of natural anthocyanin antioxidants, have demonstrated a broad spectrum of biomedical functions. These include cardiovascular disorders, advancing age-induced oxidative stress, inflammatory responses, and diverse degenerative diseases. Berry anthocyanins also improve neuronal and cognitive brain functions, ocular health as well as protect genomic DNA integrity. This chapter demonstrates the beneficial effects of wild blueberry, bilberry, cranberry, elderberry, raspberry seeds, and strawberry in human health and disease prevention. Furthermore, this chapter will discuss the pharmacological benefits of a novel combination of selected berry extracts known as OptiBerry, a combination of wild blueberry, wild bilberry, cranberry, elderberry, raspberry seeds, and strawberry, and its potential benefit over individual berries. Recent studies in our laboratories have demonstrated that OptiBerry exhibits high antioxidant efficacy as shown by its high oxygen radical absorbance capacity (ORAC) values, novel

antiangiogenic and antiatherosclerotic activities, and potential cytotoxicity towards *Helicobacter pylori*, a noxious pathogen responsible for various gastrointestinal disorders including duodenal ulcer and gastric cancer, as compared to individual berry extracts. OptiBerry also significantly inhibited basal MCP-1 and inducible NF-kappa-beta transcriptions as well as the inflammatory biomarker IL-8, and significantly reduced the ability to form hemangioma and markedly decreased EOMA cell-induced tumor growth in an in vivo model. Overall, berry anthocyanins trigger genetic signaling in promoting human health and disease prevention.

(7)

[Ann N Y Acad Sci.](#) 2007 Apr;1100:470-85.

Fruit polyphenols and their effects on neuronal signaling and behavior in senescence.

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The onset of age-related neurodegenerative diseases superimposed on a declining nervous system could exacerbate the motor and cognitive behavioral deficits that normally occur in senescence. It is likely that, in cases of severe deficits in memory or motor function, hospitalization and/or custodial care would be a likely outcome. This means that unless some way is found to reduce these age-related decrements in neuronal function, healthcare costs will continue to rise exponentially. Thus, it is extremely important to explore methods to retard or reverse the age-related neuronal deficits as well as their subsequent, behavioral manifestations. Applying molecular biological approaches to slow aging in the human condition may be years away. So it is important to determine what methods can be used today to increase healthy aging, forestall the onset of these diseases, and create conditions favorable to obtaining a "longevity dividend" in both financial and human terms. In this regard, epidemiological studies indicate that consumption of diets rich in antioxidants and anti-inflammatory compounds, such as

those found in fruits and vegetables, may lower the risk of developing age-related neurodegenerative diseases, such as Alzheimer's or Parkinson's diseases (AD and PD). Research suggests that the polyphenolic compounds found in fruits, such as blueberries, may exert their beneficial effects by altering stress signaling and neuronal communication, suggesting that interventions may exert protection against age-related deficits in cognitive and motor function. The purpose of this article is to discuss the benefits of these interventions in rodent models and to describe the putative molecular mechanisms involved in their benefits.

(8)

[J Clin Biochem Nutr.](#) 2007 Mar;40(2):92-100.

Ferulic Acid: therapeutic potential through its antioxidant property.

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There has been considerable public and scientific interest in the use of phytochemicals derived from dietary components to combat human diseases. They are naturally occurring substances found in plants. Ferulic acid (FA) is a phytochemical commonly found in fruits and vegetables such as tomatoes, sweet corn and rice bran. It arises from metabolism of phenylalanine and tyrosine by Shikimate pathway in plants. It exhibits a wide range of therapeutic effects against various diseases like cancer, diabetes, cardiovascular and neurodegenerative. A wide spectrum of beneficial activity for human health has been advocated for this phenolic compound, at least in part, because of its strong antioxidant activity. FA, a phenolic compound is a strong membrane antioxidant and known to positively affect human health. FA is an effective scavenger of free radicals and it has been approved in certain countries as food additive to prevent lipid peroxidation. It effectively scavenges superoxide anion radical and inhibits the lipid peroxidation. It possesses antioxidant property by virtue of its phenolic hydroxyl group in its structure. The hydroxy and phenoxy groups of FA donate electrons to quench the free radicals. The phenolic radical in turn

forms a quinone methide intermediate, which is excreted via the bile. The past few decades have been devoted to intense research on antioxidant property of FA. So, the present review deals with the mechanism of antioxidant property of FA and its possible role in therapeutic usage against various diseases.

(9)

[Nutrition](#). 2006 Mar;22(3):295-302.

Effects of Concord grape juice on cognitive and motor deficits in aging.

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OBJECTIVE: Animals and humans show increased motor and cognitive declines with aging that are thought to be due to increased susceptibility to the long-term effects of oxidative stress and inflammation. Previous findings have suggested that reversals in these age-related declines might be accomplished by increasing the dietary intake of polyphenolics found in fruits and vegetables, especially those identified as being high in antioxidant and anti-inflammatory activities. **METHODS:** We investigated the beneficial effects of two concentrations of Concord grape juice (10% and 50%) compared with a calorically matched placebo for their effectiveness in reversing age-related deficits in behavioral and neuronal functions in aged Fischer 344 rats. **RESULTS:** Rats that drank the 10% grape juice from age 19 to 21 mo had improvements in oxotremorine enhancement of K⁺-evoked release of dopamine from striatal slices and in cognitive performance on the Morris water maze, and the 50% grape juice produced improvements in motor function. **CONCLUSIONS:** These findings suggest that, in addition to their known beneficial effects on cancer and heart disease, polyphenolics in foods may be beneficial in reversing the course of neuronal and behavioral aging, possibly through a multiplicity of direct and indirect effects that can affect a variety of neuronal parameters.

(10)

[Nutr Cancer](#). 2006;54(1):13-7.

Bioavailability of quercetin from berries and the diet.

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Berries are a rich source of various polyphenols, including the flavonoid quercetin. In this article, the results of three intervention studies investigating the bioavailability of quercetin from berries are reviewed. In the first study, we investigated the short-term kinetics of quercetin after consumption of black currant juice and showed that quercetin is rapidly absorbed from it. In the second study, we showed that plasma quercetin levels increase up to 50% in subjects consuming 100 g/day of bilberries, black currants, and lingonberries as a part of their normal diets for 2 mo. In the third study, healthy subjects consumed a diet high or low in vegetables, berries, and other fruit for 6 wk. Quercetin concentrations nearly doubled in the high-vegetable, -berry, and -other fruit group and decreased by 30% in subjects consuming less of these foods than normally. The results showed that plasma quercetin is bioavailable from a diet containing berries and indicate that it may be a good biomarker of fruit and vegetable intake in general.

(11)

[Nutrition](#). 2006 Mar;22(3):295-302.

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increasing the dietary intake of polyphenolics found in fruits and vegetables, especially those identified as being high in antioxidant and anti-inflammatory activities. **METHODS:** We investigated the beneficial effects of two concentrations of Concord grape juice (10% and 50%) compared with a calorically matched placebo for their effectiveness in reversing age-related deficits in behavioral and neuronal functions in aged Fischer 344 rats. **RESULTS:** Rats that drank the 10% grape juice from age 19 to 21 mo had improvements in oxotremorine enhancement of K⁺-evoked release of dopamine from striatal slices and in cognitive performance on the Morris water maze, and the 50% grape juice produced improvements in motor function. **CONCLUSIONS:** These findings suggest that, in addition to their known beneficial effects on cancer and heart disease, polyphenolics in foods may be beneficial in reversing the course of neuronal and behavioral aging, possibly through a multiplicity of direct and indirect effects that can affect a variety of neuronal parameters.

(12)

[Biofactors](#). 2005;23(4):243-51.

The action of berry phenolics against human intestinal pathogens.

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Phenolic compounds present in berries selectively inhibit the growth of human gastrointestinal pathogens. Especially cranberry, cloudberry, raspberry, strawberry and bilberry possess clear antimicrobial effects against e.g. salmonella and staphylococcus. Complex phenolic polymers, such as ellagitannins, are strong antibacterial agents present in cloudberry, raspberry and strawberry. Berry phenolics seem to affect the growth of different bacterial species with different mechanisms. Adherence of bacteria to epithelial surfaces is a prerequisite for colonization and infection of many pathogens. Antimicrobial activity of berries may also be related to anti-adherence activity of the berries. Utilization of enzymes in berry

processing increases the amount of phenolics and antimicrobial activity of the berry products. Antimicrobial berry compounds are likely to have many important applications in the future as natural antimicrobial agents for food industry as well as for medicine.

(13)

[Neurobiol Aging](#). 2005 Dec;26 Suppl 1:128-32.

The beneficial effects of fruit polyphenols on brain aging.

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Brain aging is characterized by the continual concession to battle against insults accumulated over the years. One of the major insults is oxidative stress, which is the inability to balance and to defend against the cellular generation of reactive oxygen species (ROS). These ROS cause oxidative damage to nucleic acid, carbohydrate, protein, and lipids. Oxidative damage is particularly detrimental to the brain, where the neuronal cells are largely post-mitotic. Therefore, damaged neurons cannot be replaced readily via mitosis. During normal aging, the brain undergoes morphological and functional modifications resulting in the observed behavioral declines such as decrements in motor and cognitive performance. These declines are augmented by neurodegenerative diseases including amyotrophic lateral sclerosis (ALS), Alzheimer's disease (AD), and Parkinson's disease (PD). Research from our laboratory has shown that nutritional antioxidants, such as the polyphenols found in blueberries, can reverse age-related declines in neuronal signal transduction as well as cognitive and motor deficits. Furthermore, we have shown that short-term blueberry (BB) supplementation increases hippocampal plasticity. These findings are briefly reviewed in this paper.

(14)

[Appl Microbiol Biotechnol](#). 2005 Apr;67(1):8-18.

Bioactive berry compounds-novel tools against human pathogens.

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Berry fruits are rich sources of bioactive compounds, such as phenolics and organic acids, which have antimicrobial activities against human pathogens. Among different berries and berry phenolics, cranberry, cloudberry, raspberry, strawberry and bilberry especially possess clear antimicrobial effects against, e.g. Salmonella and Staphylococcus. Complex phenolic polymers, like ellagitannins, are strong antibacterial agents present in cloudberry and raspberry. Several mechanisms of action in the growth inhibition of bacteria are involved, such as destabilisation of cytoplasmic membrane, permeabilisation of plasma membrane, inhibition of extracellular microbial enzymes, direct actions on microbial metabolism and deprivation of the substrates required for microbial growth. Antimicrobial activity of berries may also be related to antiadherence of bacteria to epithelial cells, which is a prerequisite for colonisation and infection of many pathogens. Antimicrobial berry compounds may have important applications in the future as natural antimicrobial agents for food industry as well as for medicine. Some of the novel approaches are discussed.

(15)

[Am J Clin Nutr.](#) 2005 Jan;81(1 Suppl):313S-316S.

Reversing the deleterious effects of aging on neuronal communication and behavior: beneficial properties of fruit polyphenolic compounds.

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Despite elegant research involving molecular biology studies and determination of the genetic mechanisms of aging, practical information on how to forestall or reverse the deleterious effects

of aging may be years away. If this is the case, then it is prudent to try to establish other methods that can be used now to alter the course of aging. Numerous epidemiologic studies have indicated that individuals who consume diets containing large amounts of fruits and vegetables may reduce their risk for developing age-related diseases such as Alzheimer disease. Research from our laboratory suggested that dietary supplementation with fruit or vegetable extracts high in antioxidants (eg, blueberry or spinach extracts) might decrease the enhanced vulnerability to oxidative stress that occurs in aging. These reductions might be expressed as improvements in motor and cognitive behavior. Additional research suggested that mechanisms in addition to antioxidant and antiinflammatory activities might be involved in the beneficial effects of these extracts; the most important of these might be their ability to increase cellular signaling and neuronal communication.

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