

Identification of Dietary Antioxidants which Protect Against Cardiovascular Diseases (BioRap)

BioRap Technologies and the Lipid Research Laboratory of the Rappaport Family Institute are offering collaboration for the identification of antioxidant and anti - atherogenic properties of nutritional antioxidants

The lipid research laboratory, headed by Professor Michael Aviram, focuses its research on the mechanisms of the anti atherogenic actions of nutritional antioxidants, such as vitamin E, carotenoids (beta Carotene, Lycopene), and polyphenols found in red wine, pomegranates, olive, date, marula, ginger and licorice. The laboratory also studies mechanisms that are responsible for cholesterol accumulation in arterial wall macrophages, the hallmark of early atherosclerosis development, with special emphasis on the role of oxidative stress in atherogenesis.

Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are unstable and short-lived chemical entities that are generated by all aerobic cells. ROS and RNS are highly reactive molecules that are capable of damaging cellular structures by oxidatively modifying proteins (protein oxidation) and sugars, by breaking DNA strands, and by damaging lipids and attacking the double bonds of polyunsaturated fatty acids that are embedded in the structure of membrane phospholipids.

The redox state of the cell is determined by the balance between the levels of oxidizing and reducing equivalents, and a reducing environment is maintained in all cells by several cellular antioxidant systems. Oxidative stress is caused by an imbalance between the production of ROS / RNS and the cell's ability to neutralize or detoxify these reactive molecules. The essential function of the cellular antioxidant (enzymatic and non-enzymatic systems) is to lower the steady state intracellular concentrations of oxidizing molecules that otherwise might cause excessive damage to cell components.

Paraoxonases (PONs) are a family of enzymes that comprise the enzymatic antioxidant defense system. There are three PON isoforms, and their activities are regulated by oxidative stress and by lipids. Nutritional antioxidants, such as pomegranate phenolics can increase PONs anti atherogenic activities and PON stability. PON1 is a serum high-density lipoprotein (HDL) -associated paraoxonase, whereas PON2 is a cellular anti oxidant hydrolase (lactonase). Both PON1 and PON2 can hydrolyze specific oxidized lipids in lipoproteins, macrophages, and atherosclerotic lesions, thus leading to attenuated atherosclerosis development.

Link to inventor page: www.aviramlipids.com

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