DOMEGRANATE EXTRACT®



A Verdure Sciences Brand

MIND & BODY

POMELLA® - SYSTEMIC IMPACT

Active individuals are typically well informed about the health benefits associated with antioxidants and their potential to optimize performance and assist in recovery associated to physical activity. However, not all antioxidants perform the same.

PUNICALAGIN POWER

Punicalagins are a group of potent antioxidants unique to the pomegranate fruit. These ellagitannin polyphenols are water-soluble, highly bioavailable, and supported by safety data. They are shown to possess a high absorption rate (up to 95%). Not only are punicalagins known to offer a powerful kick of antioxidant properties on their own, they are among the most ferocious scavengers of free radicals, or unstable molecules that can cause damage to the body over time. They also display some other interesting activities, such as potent modulation of inflammation and protective effects of DNA and cellular signaling.



Punicalagins are unique because they are able to break apart, or hydrolyze, into smaller daughter polyphenols (such as ellagic acid) once in the blood stream, and extensively metabolize and absorb into target tissues.

However, there is a catch to pomegranate bioavailability. Research shows that punicalagins, the major ellagitannins from pomegranate, efficiently hydrolyze into ellagic acid and further into urolithins. It also suggests that taking high levels of ellagic acid does not warrant the same health benefits. Patented Pomella[®] Pomegranate Extract is standardized to deliver efficacious punicalagins and metabolites, addressing this issue.

ANTIOXIDANT + INFLAMMATORY RESPONSE

OXIDATIVE STRESS

Pomella's patented extraction process delivers an ellagitannin rich profile standardized to punicalagin content. Indeed, these ellagitannins found in the pomegranate fruit are capable of reducing oxidative stress. In healthy human volunteers, a single dose of Pomella[®] led to a significant 32% increase of antioxidant activity in the blood. Bioactive punicalagin derived metabolites were detected in half an hour after dosing³. In fact, metabolites of punicalagins have been detected in the body throughout a timeframe of up to 48-hours after consumption².

ANTI GLYCATION ENDPRODUCTS

Anti Glycation Endproducts (AGE's) are formed in high amounts during normal physiological aging in various areas of the body including the brain, joints, skin, and other organs. AGE's are implicated in numerous age-related concerns. Research shows accumulation of AGE's in cartilage chondrocytes exhibit decreased proteoglycan and collagen synthesis, which, in turn, leads to stiffness and brittleness of the articular cartilage. AGE's can also up-regulate the production of MMP's that mediate cartilage degradation, leading to joint destruction10. With this in mind, Pomella was studied in a gut-brain model, looking specifically at AGE's associated along the gut-brain axis. In this study, Pomella[®] was shown to work better than the control in a concentration-dependent manner¹¹.



[†]Punicalagins are shown to work better than aminoguanidine to inhibit late stage glycation in a concentration-dependent manner. (3)

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CARTILAGE INTEGRITY

PROTEOGLYCANS AND COLLAGEN TYPE II

A major concern in sports nutrition is maintaining healthy joints, which is relevant across all demographics of physical activity. Additionally, levels of collagen decrease naturally with age, regardless of athletic ability. Type II collagen makes up approximately 50% of the cartilage protein in the joints, and when the levels of this type of collagen drop, cartilage weakens and may stop regenerating. Adequate amounts of cartilage and the lubrication of hyaluronic acid are integral to joint health. Those who play sports or regularly participate in vigorous exercise routinely discount the need for adequate recovery time and proper nutrition, effecting the body's natural

Researchers at the University of Rhode Island examined the role of Pomella® Extract (standardized to punicalagin) in a cartilage degradation model, finding protective effects on collagen by inhibiting the collagenases MMP-2,

MMP-9, and MMP-13. Cartilage destruction is a key component in many joint specific

Inflammation is commonly caused by cartilage destruction which can be defined as the degradation of cartilage proteins, proteoglycans (protein + glucose), and collagen (consisting of structural proteins)

bone

cartilage

inflammation

ailments, and it is characterized by the degradation of cartilage proteins, proteoglycans, and type II collagen, which are embedded within the extracellular matrix. The researchers go on to explain that, "while proteoglycan loss can be reversed, the degradation of type II collagen is irreversible and has been correlated with an over-expression and over-activation of matrix metalloproteinases (MMP's).¹" In this study, Pomella's punicalagins inhibit MMP-2, MMP-9, and MMP-13-mediated degradation of type II collagen in vitro.¹

NITRIC OXIDE AND ENDOTHELIAL HEALTH

Nitric oxide (NO) is the most important endothelium-dependent vasodilator produced by the endothelial nitric oxide synthase (eNOS) in the blood vessels. Evidence suggests that pomegranate can improve nitric oxide bioavailability and NO-dependent physiologic processes, including NO-mediated endothelial function. Punicalagins are hydrolyzable tannins present in Pomella, and once consumed are hydrolyzed into ellagic acid, further metabolized by the intestinal microbiota to produce urolithins. Punicalagins and a mix of circulating ellagitannin metabolites, such as urolithins, can increase the bioactivity of endothelial nitric oxide synthase (eNOS), the enzyme responsible for generating nitric oxide in the blood vessels. This has been demonstrated in vitro and in vivo⁴⁻⁷. Pomegranate, via antioxidant effects interacts with and destroys reactive oxygen species and, thereby, prevents the oxidative destruction of nitric oxide⁸.

Nitric oxide bioavailability is important for healthy joints due to its role as a mediator of vasodilation, inflammation, and pain perception. Articular cartilage lesions in the athletic population resulting from inadequate healing capacity can lead to progressive pain and functional limitation over time. If left untreated, isolated cartilage lesions can lead to progressive chondropenia, or global cartilage loss over time. Repetitive loading of the injured articular cartilage results in further cellular degeneration with accumulation of degradative enzymes and cytokines, disruption of collagen ultrastructure, increased hydration, and fissuring of the articular surface.9

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UROLITHINS

THE GUT BRAIN AXIS

Researchers at the University of Rhode Island have found that gut microflora metabolizes punicalagins into the bioactive metabolites, urolithins. These metabolites are able to cross the blood brain barrier. The director of the George & Anne Ryan Institute for Neuroscience, recognizes the role the gut microflora can play in protecting and improving cognition and brain function, "An increasing number of studies suggest that diet and lifestyle has important effects on health in general and specifically on brain health," said Paula Grammas. These researchers also developed a Neuroprotective Potential Algorithm (NPA) to evaluate plant extracts in a panel of bioassays targeting oxidative stress, carbonyl stress, protein

glycation, amyloid beta (Aβ) fibrillation, acetylcholinesterase (AChE) inhibition, and neuroinflammation. Initial evaluations included: 1) total polyphenol content (Folin-Ciocalteu assay), 2) free radical scavenging capacity (DPPH assay), 3) ferric reducing antioxidant power (FRAP assay), 4) reactive carbonyl species scavenging capacity (methylglyoxal trapping assay), 5) anti-glycative effects (BSA-fructose, and BSA-methylglyoxal assays) and, 6) anti-A β fibrillation effects (thioflavin-T assay). Additional screenings examined the inhibitory effects on AChE activity, 2) in vitro anti-inflammatory effects on murine BV-2 microglial cells and 3) in vivo neuroprotective effects on C elegans. Pomella[®] was ranked first in the initial screening for neuroprotective potential based on polyphenol content, antioxidant capacity, anti-glycative effects, and anit-Aβ fibrillation activities. Furthermore, Pomella[®] was ranked in the top three extracts overall after additional assays were included.¹¹

SUMMARY

Pomella[®] packs a powerful punch[,] delivering efficacious punicalagins and metabolites throughout the body and into target tissues. Whether enjoying an active lifestyle or a dedicated athlete, or simply an effort to maximize associated health benefits, Pomella[®] is able to offer tangible benefits that all demographics can enjoy. Punicalagins are unique to the pomegranate fruit, and Pomella[®] is a patent protected pomegranate extract standardized to punicalagin content. These powerful antioxidants then breakup into smaller molecules in the body, allowing them to deliver the efficacious benefits we seek. Once circulating in the body, trace molecules of Pomella can be detected for up to 48-hours after consumption!²

In conclusion, Pomella's[®] ability to support the health of active individuals includes, cognitive health, joint health, vascular endothelial health, along with an impact through the gut-brain axis. Specifically, Pomella[®] has shown beneficial impact in advanced glycation endproducts, proteoglycans and MMP's associated with connective tissues, and nitric oxide bioavailability.

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

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