



# Pomegranate Extract

©2009 Huntington College of Health Sciences

Literature Education Series On Dietary Supplements

By Gene Bruno, MS, MHS – Dean of Academics, Huntington College of Health Sciences

*Smart Supplementation™ is a free series of educational literature created by Huntington College of Health Sciences (HCHS) as a public service. Although copyrighted, it may be freely photocopied and distributed, but may not be altered in any way. Smart Supplementation™ is not intended as medical advice. For diagnosis and treatment of any medical condition, consult your physician.*

The pomegranate originated from Persia (Iran) and has been cultivated in Central Asia, Georgia, Armenia and the Mediterranean region for several millennia<sup>1</sup>; eventually making its way to other parts of the world. More recently, pomegranates have been a source of interest due to their health benefits; as described below.

### **Antioxidant properties**

To begin with, pomegranates are high in polyphenolic compounds, making its juice higher in antioxidant activity than red wine and green tea.<sup>2</sup> The most abundant of these compounds is ellagic acid which has been shown in research to be the antioxidant responsible for the free-radical scavenging ability of pomegranate juice.<sup>3</sup> In animal research, pomegranate extract has also been shown to protect the antioxidant enzymes catalase, peroxidase, and superoxide dismutase from the effects of toxic chemicals.<sup>4</sup>

### **Anti-tumor/Anticancer effects**

According to some researchers<sup>5</sup>, the actions of pomegranate's components suggest a wide range of clinical applications for the treatment and prevention of cancer, as well as other diseases where chronic inflammation is believed to play an essential developmental role. Pomegranate extract has been shown to inhibit the growth of human prostate cancer cells cultured in laboratory dishes, as well as slow prostate cancer growth in mice.<sup>6</sup>

An advantage that pomegranate has is that it seems to be capable of intervening at more than one critical

pathway in the process of carcinogenesis.<sup>7</sup> In other research<sup>8</sup>, mice pretreated with pomegranate extract showed 70% less tumor incidence compared to mice that didn't receive the extract. The authors of the study indicated pomegranate fruit extract "possesses anti-skin-tumor promoting effects," and may possess chemopreventive activity "in a wide range of tumor models."

Additional research demonstrated that pomegranate seed oil was a safe and effective agent against skin cancer<sup>9</sup> and colon cancer tumors<sup>10</sup>; and also inhibited the proliferation of human breast cancer cells up to 90%.<sup>11</sup> Likewise, pomegranate juice polyphenols have been shown to inhibit cancerous lesion formation by 47% in the mammary gland cells from mice.<sup>12</sup>

### **Cardiovascular benefits**

Even more so than its anti-tumor/anticancer effects, pomegranate is known for its cardiovascular benefits. Human research has shown pomegranate to be effective in reducing several heart risk factors. In one study pomegranate inhibited the oxidation of low-density lipoprotein (LDL), and slowed the development of atherosclerosis.<sup>13</sup> As a matter of fact, ten patients supplemented with pomegranate juice for one year experienced a 30% reduction in the narrowing of the carotid artery walls. Likewise, diabetic patients with elevated blood lipids who were supplemented with pomegranate juice for eight weeks experienced significant reductions in their total cholesterol, LDL, LDL:HDL (high-density lipoprotein) ratio, and total cholesterol:HDL ratio.<sup>14</sup>

Pomegranate has also been shown to reduce systolic blood pressure by 21% after one year.<sup>15</sup> In other research, pomegranate reduced systolic blood pressure by inhibiting serum angiotension converting enzyme (ACE)<sup>16</sup>; a mechanism of action similar to ACE-inhibitor drugs which are used in controlling blood pressure, treating heart failure and preventing kidney damage in people with hypertension or diabetes.

## Other potential benefits

Research has shown that pomegranate fruit extract can block enzymes that contribute to cartilage degradation in osteoarthritis<sup>17</sup>, suggesting a possible application for this disorder. In animal research pomegranate extract reduced weight and caloric intake.<sup>18</sup> Pomegranate can also increase nitric oxide synthetase activity in the blood vessel endothelium. Nitric oxide synthetase increases the availability of nitric oxide, an antioxidant and vasodilator.<sup>19</sup> Animal research suggests the antioxidant activity of pomegranates might help prevent arteriogenic erectile dysfunction.<sup>20</sup> In addition pomegranate appears to have gastroprotective effects. Animal research shows that pomegranate extract reduces gastric ulceration due to aspirin and alcohol<sup>21</sup>; and may help enhance B-cell function (a component of the immune system).<sup>22</sup>

## References

- 1 Wikipedia. Pomegranate. Retrieved March 21, 2007 from [http://en.wikipedia.org/wiki/Pomegranate#\\_note-7](http://en.wikipedia.org/wiki/Pomegranate#_note-7).
- 2 Malik A, Afaq A, Sarfaraz S, Adhami VM, Syed DN, Mukhtar H. Pomegranate fruit juice for chemoprevention and chemotherapy of prostate cancer. *PNAS* 2005; 102:14813-14818.
- 3 Wikipedia. Pomegranate. Retrieved March 21, 2007 from [http://en.wikipedia.org/wiki/Pomegranate#\\_note-7](http://en.wikipedia.org/wiki/Pomegranate#_note-7).
- 4 Chidambara Murthy KN, Jayaprakasha GK, Singh RP. Studies on antioxidant activity of pomegranate (*Punica granatum*) peel extract using in vivo models. *J Agric Food Chem* 2002; 50(17):4791-5.
- 5 Lansky EP, Newman RA. *Punica granatum* (pomegranate) and its potential for prevention and treatment of inflammation and cancer. *Journal of ethnopharmacology* 2007; 109(2):177-206.
- 6 Malik A, Afaq A, Sarfaraz S, Adhami VM, Syed DN, Mukhtar H. Pomegranate fruit juice for chemoprevention and chemotherapy of prostate cancer. *PNAS* 2005; 102:14813-14818.
- 7 Afaq F, Saleem M, Krueger CG, Reed JD, Mukhtar H. Anthocyanin-and hydrolyzable tannin-rich pomegranate fruit extract modulates MAPK and NF-kappaB path- ways and inhibits skin tumorigenesis in CD-1 mice. *Int J Cancer* 2005; 113(3):423-33.
- 8 Afaq F, Saleem M, Krueger CG, Reed JD, Mukhtar H. Anthocyanin-and hydrolyzable tannin-rich pomegranate fruit extract modulates MAPK and NF-kappaB path- ways and inhibits skin tumorigenesis in CD-1 mice. *Int J Cancer* 2005; 113(3):423-33.
- 9 Hora JJ, Maydew ER, Lansky EP, Dwivedi C. Chemopreventive effects of pomegranate seed oil on skin tumor development in CD1 mice. *J Med Food* 2003; 6(3):157- 61.
- 10 Kohno H, Suzuki R, Yasui Y, Hosokawa M, Miyashita K, Tanaka T. Pomegranate seed oil rich in conjugated linolenic acid suppresses chemically induced colon carcinogenesis in rats. *Cancer Sci* 2004; 95(6):481-6.
- 11 Kim ND, Mehta R, Yu W, et al. Chemopreventive and adjuvant therapeutic potential of pomegranate (*Punica granatum*) for human breast cancer. *Breast Cancer Res Treat* 2002; 71(3):203-17.
- 12 Kim ND, Mehta R, Yu W, et al. Chemopreventive and adjuvant therapeutic potential of pomegranate (*Punica granatum*) for human breast cancer. *Breast Cancer Res Treat* 2002; 71(3):203-17.
- 13 Aviram M, Rosenblat M, Gaitini D, et al. Pomegranate juice consumption for 3 years by patients with carotid artery stenosis reduces common carotid intima-media thickness, blood pressure and LDL oxidation. *Clin Nutr* 2004; 23(3):423-33.
- 14 Esmailzadeh A, Tahbaz F, Gaieni I, Alavi- Majd H, Azadbakht L. Concentrated pomegranate juice improves lipid profiles in diabetic patients with hyperlipidemia. *J Med Food* 2004; 7(3):305-8.
- 15 Aviram M, Rosenblat M, Gaitini D, et al. Pomegranate juice consumption for 3 years by patients with carotid artery stenosis

reduces common carotid intima-media thickness, blood pressure and LDL oxidation. *Clin Nutr* 2004; 23(3):423-33.

<sup>16</sup> Aviram M, Dornfeld L. Pomegranate juice consumption inhibits serum angiotensin converting enzyme activity and reduces systolic blood pressure *Atherosclerosis* 2001; 158(1):195-8

<sup>17</sup> Ahmed S, Wang N, Hafeez BB, Cheruvu VK, Haqqi TM. *Punica granatum* L. Extract Inhibits IL-1 $\beta$ -Induced Expression of Matrix Metalloproteinases by Inhibiting the Activation of MAP Kinases and NF- $\kappa$ B in Human Chondrocytes In Vitro. *J Nutr* 2005; 135:2096-2102.

<sup>18</sup> Lei F, Zhang XN, Wang W, et al. Evidence of anti-obesity effects of the pomegranate leaf extract in high-fat diet induced obese mice. *Int J Obes* 2007; advance online publication 13 February 2007; doi: 10.1038/sj.ijo.0803502.

<sup>19</sup> e Nigris F, Williams-Ignarro S, Lerman LO, et al. Beneficial effects of pomegranate juice on oxidation-sensitive genes and endothelial nitric oxide synthase activity at sites of perturbed shear stress. *Proc Natl Acad Sci U S A* 2005; 102:4896-901.

<sup>20</sup> Azadzoï KM, Schulman RN, Aviram M, Siroky MB. Oxidative stress in arteriogenic erectile dysfunction: prophylactic role of antioxidants. *J Urol* 2005; 174:386-93.

<sup>21</sup> Ajaikumar KB, Asheef M, Babu BH, Padikkala J. The inhibition of gastric mucosal injury by *Punicagranatum* L. (pomegranate) methanolic extract. *J Ethnopharmacol* 2005;96:171-6.

<sup>22</sup> Masao Y, Takae K, Nami K, Hitomi C, Hidenori M, K-M Junko, Jun I, Hirofumi T, Koji Y. Dietary effect of pomegranate seed oil on immune function and lipid metabolism in mice. *Nutrition* 2006; 22(1):54-9.



For more than two decades, Huntington College of Health Sciences (HCHS) has offered more than a conventional undergraduate or graduate education. Our accredited\*, distance learning degrees and diploma programs also include the breadth of responsible complementary and alternative medicine viewpoints, providing our students with a well-rounded and comprehensive approach to nutrition and the health sciences:

- Master of Science in Nutrition
- Bachelor of Health Science in Nutrition
- Associate of Science in Applied Nutrition
- Diploma in Comprehensive Nutrition
- Diploma in Dietary Supplement Science
- Diploma in Sports Nutrition
- Diploma in Women's Nutrition
- Diploma in Natural Sciences
- Diploma in Small Business Management

1204D Kenesaw  
Knoxville, TN 37919  
865-524-8079 • 800-290-4226  
E-Mail: [studentservices@hchs.edu](mailto:studentservices@hchs.edu)  
[www.hchs.edu](http://www.hchs.edu)

\*Accredited member Distance Education & Training Council.