

Ginger

A potent root



- Because of its pungent taste and interesting aroma, ginger has been used since the ancient times as a spice.
- In addition, ginger has been used historically for its medicinal value in a wide variety of diseases, especially in gastrointestinal disorders, such as constipation, diarrhea, anorexia, colic, dyspepsia, nausea, vomiting, and motion sickness.
- Ginger, which is the underground stem or rhizome of the plant *Zingiber officinale* Roscoe, remains an important cooking spice around the world.
- Many investigations have recently reported the health effects of ginger.

Medicinal Properties associated with Ginger

- Anti-inflammatory properties
- Anti-thrombotic properties
- Cholesterol-lowering properties
- Blood pressure-lowering properties
- Antimicrobial properties
- Antioxidant properties
- Antitumor properties
- Hypoglycemic properties

Because of these properties listed, it is no wonder why some studies have linked the consumption of ginger with beneficial effects in:

- **Heart Disease**
- **Cancer**
- **Hypertension**
- **Obesity**
- **Diabetes**
- **Osteoarthritis**
- **Bacterial infections**

The Health Effects of Ginger

Coronary Heart Disease

There are several studies on the effect of ginger on [Coronary Heart Disease](#) (CHD).

A study looked at the effects of ginger (and another substance known as fenugreek) consumption on blood lipids, blood sugar, and platelet aggregation in patients with CHD. Patients recruited for this study included healthy individuals, individuals with CHD, and patients with type 2 diabetes mellitus (T2DM) [with or without CHD].

Researchers found:

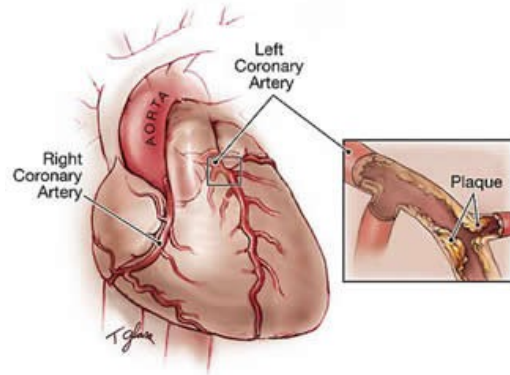
- No effects on platelet aggregation, blood lipids, or blood sugars in CHD patients when ginger was given at a low dose (4 g/day) for 3 months. However, when given a single large dose (10 g) of ginger, **significant reductions** in platelet aggregation were seen, indicating that large doses are necessary for the greatest benefit.
- Fenugreek had a **significant effect** on blood lipids (after 3 months) in those with CHD and T2DM and significant effects on blood sugar in those with DM.



Diabetes

Ginger has been shown to possess anti-diabetic activity in a variety of animal studies. A study found that when rats were given ginger juice for 6 weeks, the risk for developing diabetes was reduced. The researchers found that treatment with *ginger* significantly increased insulin levels and decreased fasting glucose levels. Treatment with *ginger* also produced other favorable effects in diabetic rats, including decreases in serum cholesterol, triglycerides, and blood pressure.

A ginger preparation was administered to normal and cholesterol-fed male rats in order to see if blood lipids would decrease. Ginger preparation, Trikatu, was a potent **hypo-lipidemic agent** because of its ability to reduce triglycerides and LDL cholesterol and to increase HDL.



Ginger's effectiveness for reducing **blood pressure** (BP) was assessed under varied dosages. A dose-dependent (0.3—3 mg/kg) decrease was noted in arterial BP, which provides support for ginger's role in BP regulation.

Aldose reductase is an enzyme that plays a very minor role in healthy humans. However, this is not the case in diabetics. In fact, it is the abnormal metabolic results of this enzyme believed to be responsible for many diabetic complications. Because ginger has been found to have at least 5 components which work as aldose reductase inhibitors, **ginger** is believed to play an important role in the prevention of **diabetes complications**.

The Health Effects of Ginger

Cancer

A tumor requires new blood vessel development. The most important factor associated with induction and maintenance of the new vasculature in human tumors is a component known as the vascular endothelial growth factor (VEGF). If a component is tumor preventive, we would expect it to suppress VEGF and prevent new vessel formation.



Study 2: Another study wanted to investigate the effect of ginger on colon carcinogenesis in rats. The rats received weekly injections of a carcinogen for 15 weeks and 50 mg/kg of ginger daily by mouth.

Results:

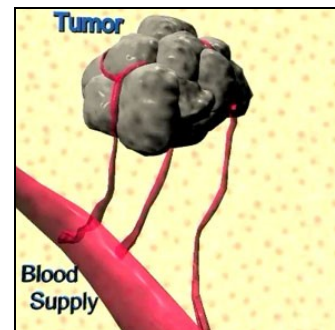
- In the presence of the known cancer carcinogen, plasma lipids were oxidized and cancer incidence were significantly increased, while antioxidants were significantly decreased.
- Ginger supplemented rats had a significantly smaller number of tumors and cancer incidence. In addition, supplemented rats had significantly less lipid oxidation and higher level of enzymatic and non-enzymatic antioxidants.

Several studies have shown that ginger possesses tumor preventive properties.

Study 1: The component [6]-gingerol, was tested for effectiveness in preventing new vessel formation. In cell cultures, [6]-gingerol inhibited both the VEGF- and bFGF-induced growth of human skin cells. The ginger component actually stopped the cell from reproducing. In addition, [6]-gingerol also blocked capillary-like tube formation by endothelial cells, strongly inhibited sprouting of endothelial cells in the rat aorta, and inhibited the formation of new blood vessels in the mouse cornea.

When mice were injected with [6]-gingerol, the growth of cancerous melanoma cells was reduced.

Results of this study demonstrate that [6]-gingerol does inhibit angiogenesis and may be useful in the treatment of tumors and other angiogenesis-dependent diseases.



Osteoarthritis

Ginger has been suggested to possess anti-arthritic properties. When the effect of ginger root extract (GRE) was tested in arthritic and normal cartilage cells there was a stepwise reduction in the inflammatory mediators in both normal and arthritic cells.

There was a stronger effect on the arthritic cells from GRE than on the normal cells.

References

- Ginger. University of Maryland Medical Center. Available at: <http://www.umm.edu/altmed/ConsHerbs/Gingerch.html>
- Ghayur M et al. *J Cardiovasc Pharmacol*. 2005; 45(1): 74-80.
- Sivakumar V, Sivakumar S. *Phytother Res*. 2004; 18(12):976-81.
- Thomson M et al. *Prostaglandins Leukot Essent Fatty Acids*. 2002; 67(6): 475-8.
- Kim E et al. *BBRC*. 2005; 335: 300-08.
- Manju V, Nalini N. *Clin Chim Acta*. 2005; 358(1-2): 60-7.
- Shen CL, Hong KJ, Kim SW. *J Med Food*. 2005; 8(2): 149-53.



Pennington Nutrition Series No 6, 2007

Authors

Heli J. Roy, PhD, RD

Shanna Lundy, MS

Chad Eriksen, BA

Beth Kalicki

Division of Education

Phillip Brantley, PhD, Director

Pennington Biomedical Research Center

Claude Bouchard, PhD, Executive Director

Edited : October 2009

Bacterial Infections

Ginger has been used in eastern medicine for the treatment of gastrointestinal ailments. The combined treatment of antibiotics and ginger were tested for the control and treatment of *Helicobacter pylori* infections.

The treatment was effective and was shown to inhibit *H. pylori* with synergistic or additive activity.

The Pennington Biomedical Research Center is a world-renowned nutrition research center.

Mission:

To promote healthier lives through research and education in nutrition and preventive medicine.

The Pennington Center has several research areas, including:

Clinical Obesity Research

Experimental Obesity

Functional Foods

Health and Performance Enhancement

Nutrition and Chronic Diseases

Nutrition and the Brain

Dementia, Alzheimer's and healthy aging

Diet, exercise, weight loss and weight loss maintenance

The research fostered in these areas can have a profound impact on healthy living and on the prevention of common chronic diseases, such as heart disease, cancer, diabetes, hypertension and osteoporosis.

The Division of Education provides education and information to the scientific community and the public about research findings, training programs and research areas, and coordinates educational events for the public on various health issues.

We invite people of all ages and backgrounds to participate in the exciting research studies being conducted at the Pennington Center in Baton Rouge, Louisiana. If you would like to take part, visit the clinical trials web page at www.pbrc.edu or call (225) 763-3000.