



Drinking to your health

Tea, the second-most consumed beverage after water is undergoing a renaissance of sorts. A strange comment perhaps, given that tea consumption has been second only to water for centuries or more. However, the renaissance referred to does not relate to its consumption levels or popularity, but rather, its renaissance as a health giving beverage.

The ancient history of tea very much revolves around its benefits in medicinal terms and tea was used to cure and heal anything from colic to depression. In its modern history, however, particularly since its introduction to the west, tea has largely been consumed as a pick-me-up beverage.

Modern science, or more accurately, modern western science and traditional medicines that largely stem from the east and which are also sometimes referred to as alternative medicine, have not often seen eye to eye. Western science has tended to spurn or play down the claims of many an eastern treatment on the basis of 1) a lack of scientific research 2) claims being scientifically researched and found to be unproven. Tea is not one of them.

Of course, it has helped that tea is not an alien substance and is widely consumed in the west, but interest shown in tea in health giving terms by western scientists has grown to astonishing proportions. Initially, most of the research revolved around green tea, the variety used for medicinal purposes in ancient times.

However, the successes obtained from research into green tea have been so stark, that research progressively extended to black tea, the variety most widely consumed outside of the orient. This research has revealed that there is plenty of common ground between green and black tea and indeed all varieties of *Camellia sinensis*. Thus, black tea is fast catching up to the reputation enjoyed by green tea.

Quite simply, the revelations on the therapeutic qualities of tea have been overwhelming. According to research, there are not many of mankind's ailments that are untouched by its therapeutic qualities. No other natural or synthetic substance comes even close to tea in terms of benefits across such a multitude of fronts. A panacea it may not be, but there is no denying that in this health conscious era, science is excited by

what tea has to offer and has placed it under their microscopes like none other before.

Underscoring the prominence given to tea by the scientific fraternity, is the formulation of the International Scientific Symposium on Tea and Human Health. In September 2007, the fourth such symposium was held in Washington D.C., USA, where scientists gathered to share the latest research findings on tea. Ongoing research strongly suggests that tea will positively affect overall health and mental condition and studies presented at the Symposium in Washington this year showed that tea can have a vast range of benefits. These included:

- ✔ reduce the risk of heart disease and stroke
- ✔ prevent colon, rectal, pancreatic, stomach, prostate and oral cancers
- ✔ reduce the risk of osteoporosis
- ✔ control blood sugar
- ✔ lower cholesterol levels
- ✔ speed up metabolism; decrease body weight and fat
- ✔ lower risk of developing kidney stones
- ✔ repair smoking-related DNA damage

It was also revealed that, studies conducted on animals suggest that tea can prevent and repair damage to brain cells – delay cognitive decline seen in Parkinson’s and Alzheimer’s disease and create a calmer, yet more alert state of mind.

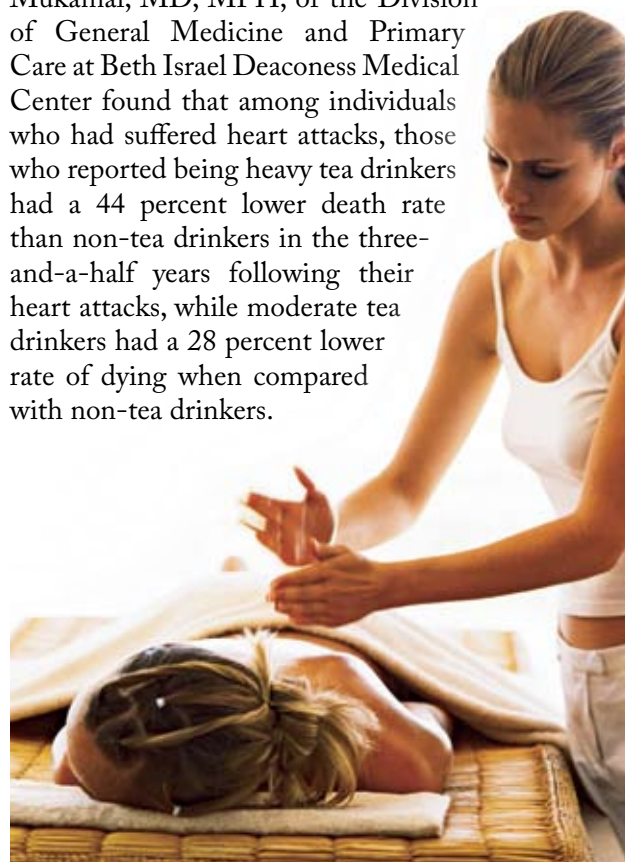
The magical constituent in tea is its high content of polyphenols, a powerful antioxidant, Although they are also present in a variety of fruits and vegetables, polyphenols occur in particularly large concentrations in the terminal shoots of *Camellia sinensis*, which is a part of the tea bush that is picked to produce tea.

As stated, the research into the effects of tea has been extensive and continues to grow rapidly. The following is recent research information in relation to tea and its effects against a variety of major ailments that afflict humans.

Heart Disease

It is strongly believed that tea, both black and green has been proven to ward off or minimise the risk of heart disease and stroke. Researchers from Tohoku University in Japan investigated data of more than 400,000 participants aged 40 to 79 years over a period of 11 years; and the death rates from heart disease, cancer and other causes were analyzed. Researchers found that the heart disease death rate from participants who drank more than five cups of green tea daily was 26 percent lower in the first seven years of study. In addition, researchers found that the benefits of green tea appeared to be stronger in women than men. The results of this study were published in the *Journal of the American Medical Association* in September 2006.

In previous studies conducted by the Beth Israel Deaconess Medical Center, an affiliate of the Harvard Medical School, into the effect of tea on existing cardiac patients it was surmised that drinking tea on a regular basis may help protect patients with existing cardiovascular disease, and that tea consumption is associated with an increased rate of survival following a heart attack. These findings were published in the May 2002 issue of *Journal of the American Heart Association*. The study's lead author Kenneth J. Mukamal, MD, MPH, of the Division of General Medicine and Primary Care at Beth Israel Deaconess Medical Center found that among individuals who had suffered heart attacks, those who reported being heavy tea drinkers had a 44 percent lower death rate than non-tea drinkers in the three-and-a-half years following their heart attacks, while moderate tea drinkers had a 28 percent lower rate of dying when compared with non-tea drinkers.



Cancer

Numerous papers have been published in the latter part of 2007 suggesting that tea has strong cancer fighting properties. One of the latest findings from Channing Laboratory at Brigham and Women's Hospital (BWH) reports that frequent consumption of the flavonoid kaempferol (flavonoids fall into the broad group of polyphenols), was associated with a reduced risk of ovarian cancer. First author of the paper Margaret Gates, a researcher at the Harvard School of Public Health declared this as good news as very few lifestyle factors exist that reduce the risk of ovarian cancer. The research paper was published in the November 2007 issue of the *International Journal of Cancer*.

In a paper titled, "Dietary Flavonoid Intake and Breast Cancer Survival among Women on Long Island", published in Volume 16 of *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research in November 2007, a study of 1,210 women newly diagnosed with breast cancer found that individuals with the highest intake of flavones and isoflavones prior to diagnosis had a 37 and 48 per cent lower risk of all-cause mortality. Lead author Brian Fink from the University of North Carolina stated, however, that the results are limited to postmenopausal women and that larger studies are needed to confirm the findings.

Research carried out at the Arizona Cancer Centre, USA states that green tea boosts production of detox enzymes, rendering cancerous chemicals harmless. The findings of the study, published in the August 2007 issue of *Cancer Epidemiology, Biomarkers & Prevention*, suggests that green tea concentrate might



help some people strengthen their metabolic defence against toxins capable of causing cancer. In the study of 42 people, the concentrate composed of chemicals known as green tea catechins in amounts equal to that found in 8-16 cups of green tea, boosted production of the enzymes responsible for neutralising toxins by as much as 80 percent in some participants.

In a study conducted on mice, by A.Y. Issa of the Medical University of South Carolina and the University of Columbia, it was found that green tea may stop the growth of colon tumours in their infancy. The researchers report that consumption of the green tea solution significantly inhibited the formation of new tumours in the colon, but had no effect against larger tumours. The paper titled "Green tea selectively targets initial stages of intestinal carcinogenesis in the AOM-ApcMin mouse model" has been published in the journal *Carcinogenesis*.



Arthritis/Osteoporosis

Tea has been found to contribute towards the health of bone structure and density and that the polyphenol EGCG may play a role in relieving pain in rheumatoid arthritis sufferers.

Amanda Devine and co-researchers from the University of Western Australia, writing in the October 2007 issue of the *American Journal of Clinical Nutrition*, stated that tea drinking is associated with benefits on bone density in older women. The study suggests that bone mineral density levels were 2.8 per cent greater in tea drinkers than non-tea drinkers, suggesting that the beverage has the potential to aid in the prevention of osteoporosis.

Another study from the University of Michigan Health System suggests that a compound in green tea may provide therapeutic benefits to people with rheumatoid arthritis. The study, presented in April at Experimental Biology 2007 in Washington, D.C., looks at a potent anti-inflammatory compound derived from green tea. Researchers found that the compound EGCG, inhibited the production of several molecules in the immune system that contribute to inflammation and joint damage in people with rheumatoid arthritis. The compound from green tea also was found to suppress the inflammatory products in the connective tissue of people with rheumatoid arthritis. Lead researcher on the study Salah-uddin Ahmed, Ph.D., claims the research is a very promising step in the search for therapies for the joint destruction experienced by people who have rheumatoid arthritis.

Alzheimer's disease

Tea's brain health benefit link got more support when it was found that both green and black tea could protect against age-related diseases like Alzheimer's. The research, conducted by researcher Rémi Quirion from Douglas Hospital Research Centre, Quebec and published in Vol 23 of the *European Journal of Neuroscience* in 2006 claims to be the first to show beneficial effects of both green and black tea on cell cultures treated with amyloid proteins. Although the mechanism of Alzheimer's is not clear, more support is gathering for the build-up of plaque from amyloid deposits. The deposits are associated with an increase in brain cell damage and death from oxidative stress. However, both green and black tea extracts, with concentration levels between five and 25 micrograms per millilitre, were found to give protective activity against the effects of the amyloid protein.

In 2004, a team from Newcastle University found green and black tea inhibited the activity of key enzymes in the brain associated with memory. The researchers hope their findings, published in *Phytotherapy Research*, may lead to the development of a new treatment for Alzheimer's Disease. They say tea appears to have the same effect as drugs specifically designed to combat the condition. Alzheimer's disease is associated with a reduced level of a chemical called acetylcholine in the brain. In lab tests, the Newcastle team found that both green and black tea inhibited the activity of the enzyme acetylcholinesterase (AChE), which breaks down this key chemical. They also found both teas inhibited the activity of a second enzyme butyrylcholinesterase (BuChE), which has been discovered in protein deposits found in the brain of patients with Alzheimer's. Lead researcher Dr Ed Okello said: "Although there is no cure for Alzheimer's, tea could potentially be another weapon in the armoury which is used to treat this disease and slow down its development. Professor Clive Ballard, director of research, Alzheimer's Society, said: "This interesting research builds on previous evidence that suggests that green tea may be beneficial due to anti-oxidant properties.

Immune System

In research conducted at Brigham and Women's Hospital (BWH) it has been found that drinking certain types of tea containing high concentrations of the amino acid L-theanine may help strengthen the body's immune system response when fighting off infection. The findings were first discovered in laboratory cell cultures and then verified in a small



human investigation. Lead author Jack Bukowski, MD, PhD of BWH claimed that data suggest that the amino acid L-theanine may specifically boost the capacity of gamma delta T cells – the body's first line of defense against infection. Results from the research appear in the April 21 issue of the *Proceedings of the National Academy of Sciences*.



Diabetes

Diabetes is on the rise in the world and estimates predict that there might be 380 million afflicted with the condition by 2025. Researchers from King's College London and the University of Central Lancashire led by Judith A. Bryans investigated the effect of consuming instant black tea on plasma glucose and insulin concentrations after a meal in healthy humans and published their findings in the *Journal of the American College of Nutrition*. The study, a four-way randomised, crossover trial, suggests tea could have benefits for diabetics to blunt blood sugar spikes and, keep the body's blood sugar levels relatively steady throughout the day. This has been linked to better regulation of appetite and a reduced tendency to snack. The researchers report that plasma glucose concentrations during the first hour in response to the drinks were not significantly different. However, after two hours, plasma glucose concentrations were significantly lower in the group who consumed 1.0 grams of tea, relative to the control and caffeine drinks.

Urology

Tea has also been discovered to have urological benefits. Prostate enlargement, which is a common problem to males over the age of 50 has been found to slow due to the presence of catechins in tea. A



research team led by Professor Cho Yong-hyun and Park Deok-jin of the Catholic University's Medical School said their team concluded from animal experiments that catechin-rich green tea slows the progress of prostate enlargement. The results were published in the December 2006 issue of the *Korean Urological Association Journal* and the group is expected to introduce the study to the European Association of Urology in April 2007. Other urological benefits investigated by University of Pittsburgh School of Medicine, found that components of green tea protected bladder cells from damage in culture. The study by Michael B. Chancellor, M.D. Professor of Urology and Gynecology at the University of Pittsburgh School of Medicine was presented at the annual meeting of the American Urological Association. Although further studies are needed, these results indicate herbal supplements from green tea could be a treatment option for various bladder conditions that are caused by injury or inflammation.


Stress

Tea has been found to help relieve stress. A study by University College London in 2006 found people who had tea were able to recover from stressful events more quickly than those who did not drink it. They discovered that those who drink black tea lowered their level of cortisol, a harmful stress hormone, by 47 percent on average. Professor Andrew Steptoe at UCL Department of Epidemiology and Public Health says that although drinking tea has traditionally been associated with relaxation, scientific evidence for the stress-relieving effects of black tea has been limited. The research is among the first to assess tea in a double-blind placebo study where the participants did not know whether they were drinking tea or a tea-like beverage.

UV Ray Protection

Tea can also be used as a topical gel to protect the skin from harmful effects of the sun. In a paper, "Evaluation of black tea and its protection potential against UV", by M. Turoglu and N. Cingirgil, published in the *International Journal of Cosmetic Science*, the authors state that black tea gel could provide double protection against UV radiation by absorbing UV rays and repairing DNA damage inside the skin. Topical application of black tea gel significantly reduces skin redness after exposure to UV light, illustrating protective qualities against the radiation across the spectrum, according to researchers. Black tea also exhibits skin repair properties due to its antioxidant components, according to the researchers, who reference a large body of literature that suggests black and green tea help repair UV induced skin damage.

Reducing oxidative stress

Researchers from the US Department of Agriculture (USDA) measured the blood antioxidant capacity (AOC) of subjects in a series of five clinical trials, and found that consumption of antioxidant-rich foods blunted oxidative stress after a meal rich in carbohydrates, protein, and fat. Oxidative stress has been linked to an increased risk of various diseases including cancer, Alzheimer's, and cardiovascular disease. Published in the *Journal of the American College of Nutrition* in 2007, one of the authors of the paper, R.L. Prior said, "The more calories you take in the more dietary antioxidants you need. Ensuring that your body has a steady supply of antioxidant-rich foods can help combat oxidative stress throughout the day." As tea is one of the highest sources of antioxidants, its regular consumption provides a steady supply of antioxidants. 

by David Colin-Thomé