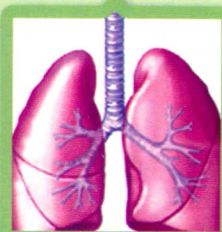


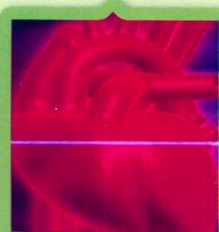


## *Cup of Black Tea... Good For Health*

Lungs



Heart



Bacterial diseases



Skin



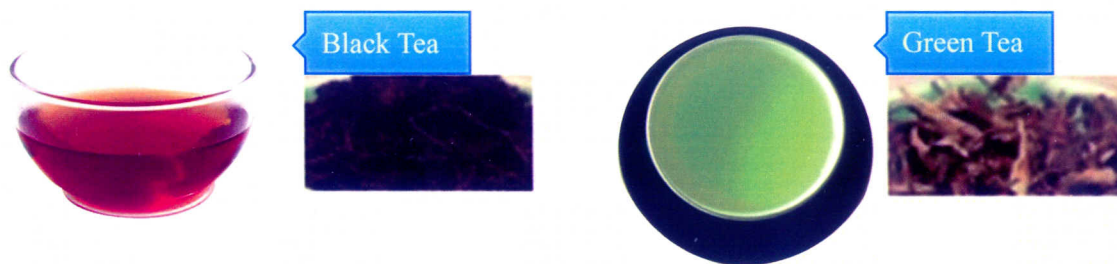
Tooth



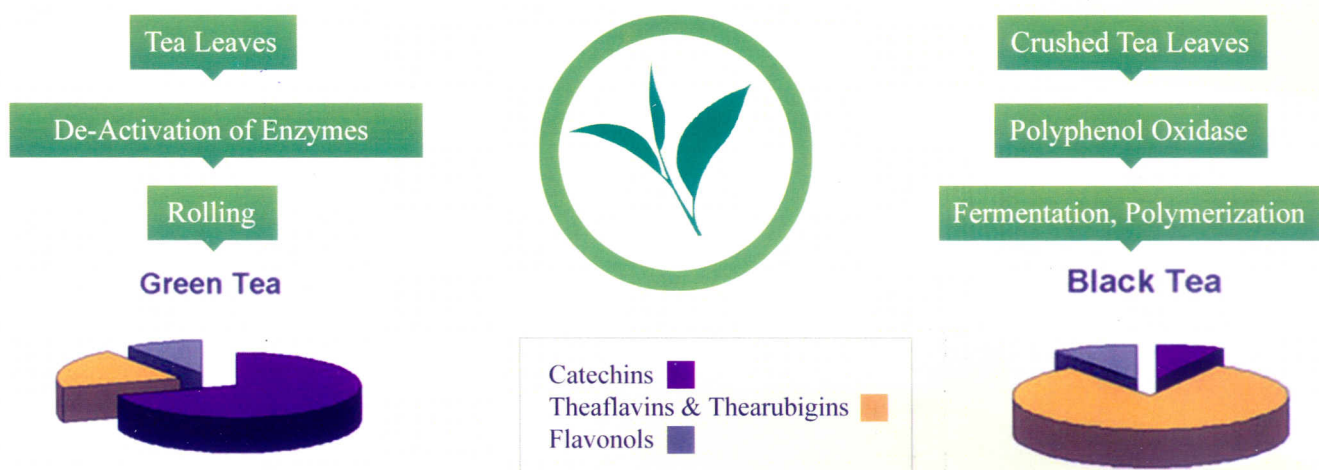
Brain



## Types of tea commonly consumed



## *Camellia sinensis* (L.) O. Kuntze



## Composition of black tea is complex

### FLAVONOIDS in TEA

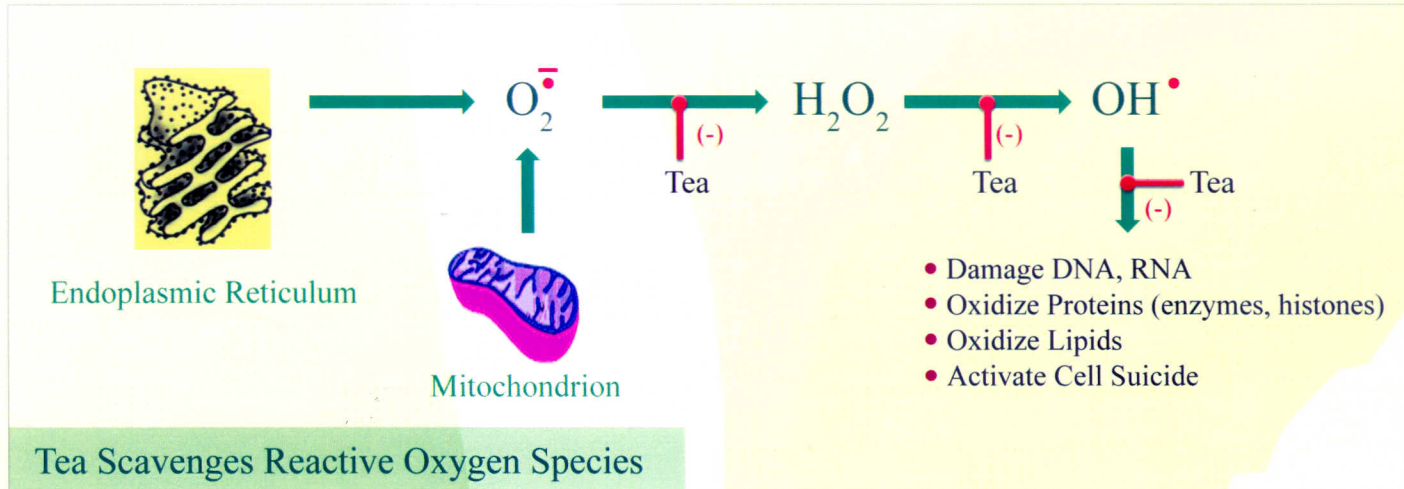
- Flavan-3-ols: The catechin monomer structures become dimers (theaflavins) and the oligomers (thearubigins) in the fermentation process during the manufacture of Black tea.
- Kaempferol, Myricetin, Quercetin  
Processing during manufacture of Black tea does not have much impact on other flavonol content of tea. Flavonols such as quercetin also are antioxidants.

## Why is black tea good for health ???

- Until recently, tea research has focused more on Green tea. Green tea has the compound like epigallocatechin gallate (EGCG), which is a powerful antioxidant.
- Since the fermentation process is used to make Black tea, catechins are converted into other compounds. Researchers in the past had assumed black tea has less health benefits than green tea. However, recent studies indicate that polyphenolic compounds in the black tea - theaflavins and thearubigins – not only contribute to the dark color and distinctive flavor of Black tea, but they represent the potential molecules with immense therapeutic implication.
- Polyphenolic compounds present in black tea can protect cells and tissues from oxidative stress by scavenging free radicals. Synergistic interactions amongst black tea constituents play a major role in the beneficial effect of tea (2).



## Black tea & reactive oxygen species (3)



## What's so great about my cup of Black Tea?

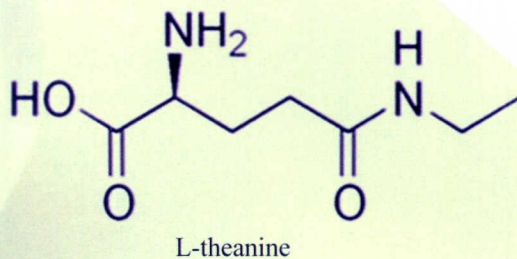
### FLAVONOIDS in TEA

- Are good for heart...(4)
- Lowers cholesterol... (5)
- Aids in weight loss...(6)
- Prevents skin damage...(7)
- Improves circulation...(8)
- Helps with good digestive health...(9)
- Soothes stress...(10)
- Is antibacterial... (11)
- Protects liver function...(12)
- Relaxes the body...(13)
- Prevents sun damage...(14)

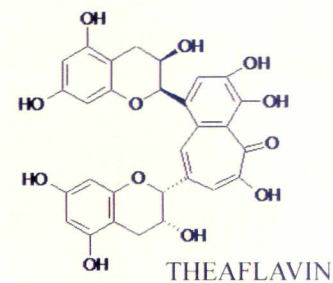
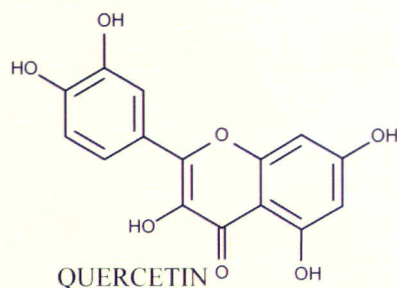
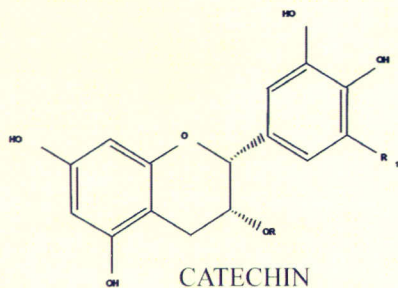
- Helps protect against diabetes...(15)
- And strengthens bones... (16)
- Bolsters your immune system...(17)
- Helps prevent arthritis...(18)
- Removes toxins from your body...(19)
- Helps prevent cancer...(20)
- Aids in maintaining healthy eyes...(21)
- And helps heal lung damage.....(22)
- Prevents gastric ulcer (23)



## Tea also contains a unique amino acid, L-theanine that has relaxing effect (24,25)



- Studies have shown that theanine decreases "worry" out of one's head by acting on some critical pathways in the brain.
- L Theanine increases GABA (gamma-amino-butyric acid), an important inhibitory neurotransmitter in the brain. GABA can be considered the brain's natural sedative that brings balance to excitability that can sometimes lead to restlessness, insomnia, and other disruptive conditions.
- L Theanine also increases levels of dopamine, another brain chemical with mood-enhancing effects.



## References

- Tea and Chronic Disease Prevention; Jane Higdon Linus Pauling Institute, Oregon State University, Ph.D., 2002, [lpi.oregonstate.edu/f-w02/tea.html](http://lpi.oregonstate.edu/f-w02/tea.html)
- W. Luczaj and E. Skrzydlewska. Antioxidative properties of Black Tea, *Preventive Medicine* .2005, *40*, 910-918
- Cadenas ,E and Packer L."Handbook of Antioxidants"; 2002 CRC Press, 2002.
- Riemersma RA, Rice-Evans CA, Tyrrell RM, Clifford MN, Lean ME. Riemersma RA, Rice-Evans CA, Tyrrell RM, Clifford MN, Lean ME . Tea flavonoids and cardiovascular health. *QJM* 2001, *94*,277-282.
- Davies MJ, Judd JT, Baer DJ, Clevidence BA, Paul DR, Edwards AJ, Wiseman SA, Muesing RA, Chen SC, J Black tea consumption reduces total and LDL cholesterol in mildly hypercholesterolemic adults.. *Nutr* 2003 , *133*: 3298S–3302S.
- Uchiyama S.,Yoshimasa T, Saka A, Yoshida A, Yajima H Prevention of diet-induced obesity by dietary black tea polyphenols extract in vitro and in vivo. *Nutrition* 2012 ,*27*,287-92.
- Bickers DR, Athar M. Novel approaches to chemoprevention of skin cancer. *J Dermatol.* 2000 ,*27*,691-695.
- Duffy SJ, Keaney JF Jr, Holbrook M, Gokce N, Swerdloff PL, Frei B, Vita JA. SO. Short- and Long-Term Black Tea Consumption Reverses Endothelial Dysfunction in Patients With Coronary Artery Disease *Circulation.* 2001,*104*,151.
- Jafari K, Faghihi M, Gharibzadeh S. Black tea extract and its major polyphenolic pigment may ameliorate the gastroin-testinal disorder in irritable bowel syndrome. *Med Hypotheses.* 2006,*67*,419.
- Steptoe A, Gibson EL, Vuononvirta R, Williams ED, Hamer M, Rycroft JA, Erusalimsky JD, Wardle J. The effects of tea on psychophysiological stress responsivity and post-stress recovery: a randomised double-blind trial. *Psychopharmacology (Berl)* .2007, *190*, 81-9.
- Bancirova M. Comparison of the antioxidant capacity and the anti-microbial activity of black and green tea. *Food Res Int.* 2010, *43*: 1379-1382
- Oyehide,O.O. and Olushola L.Hepatoprotective and antioxidant properties of extract of *Camellia sinensis* (black tea) in rats. *Afr j Biotech.* 2005,*4*, 1432-1438.
- Gardner EJ, Ruxton CHS, Leeds, AR ,Black tea--helpful or harmful? A review of the evidence. *Eur J Clin Nutr* 2007,*61*,3-18.
- Casagrande R Georgetti SR Verri WA Jr Dorta DJ dos Santos AC Fonseca MJ. Protective effect of topical formulations containing quercetin against UVB-induced oxidative stress in hairless mice. *J Photochem Photobiol B.* 2006, *84*,21-27.
- Beresniak A, Duru G, Berger G, Bremond-Gignac D. Relationships between black tea consumption and key health indicators in the world: an ecological study. *BMJ Open* 2012;*2*:e000648 doi:10.1136/bmjopen-2011-000648
- Das AS, Mukherjee M, Mitra C .Evidence for a prospective anti-osteoporosis effect of black tea (*Camellia sinensis*) extract in a bilaterally ovariectomized rat model. *Asia Pac J Clin Nutr* .2004, *13*,210-6.
- Halder B, Pramanik S, Mukhopadhyay S & Giri AK. Anticlastogenic effects of black tea polyphenols theaflavins and thearubigins in human lymphocytes in vitro. *Toxicol In Vitro*, 2006, *20*,608-13.
- Chattopadhyay C, Chakrabarti N, Chatterjee M, Mukherjee S, Sarkar K, Chaudhuri AR. Chattopadhyay C, Chakrabarti N, Chatterjee M, Mukherjee S, Sarkar K, Chaudhuri AR. Black tea (*Camellia sinensis*) decoction shows immunomodulatory properties on an experimental animal model and in human peripheral mononuclear cells., *Phcog Res* .2012 ,*4*,15 -21
- Satoh, E., Ishiu, T., Shimizu, Y., Sawamura, S. and Nishimura, IM. Black Tea Extract, Thearubigin Fraction, Counteracts the Effect of Tetanus Toxin in Mice. *Exp Biol Med (Maywood)* 2001 ,*226*,577-80.
- Halder B, Das Gupta S, Gomes A Black tea polyphenols induce human leukemic cell cycle arrest by inhibiting Akt signaling: possible involvement of Hsp90, Wnt/ $\beta$ -catenin signaling and FOXO1, *FEBS J.* 2012, *279* ,2876-91
- Vinson J and Zhang J. Black and green teas equally inhibit diabetic cataracts in a streptozotocin-induced rat model of diabetes. *J Agric Food Chem.* 2005, *53*, 3710-3.
- Banerjee S, Maity P, Mukherjee S, Sil, AK, Panda K, Chattopadhyay DJ., Sil, AK, Panda, K, Chattopadhyay, DJ, Chatterjee IB,2007 .Black tea prevents cigarette smoke-induced apoptosis and lung. *J Inflamm (Lond).* 2007,*4*,3.
- Maity S, Chaudhuri T ,Vedasiromani JR, Ganguly, DK Anti-ulcer effect of the hot water extract of black tea (*Camellia sinensis*). *J Ethnopharmacol.* 1995, *45*,223-6.
- L-Theanine—a unique amino acid of green tea and its relaxation effect in humans. Juneja LR,Chu DJ, Okubo T,Tyokogoshi H,Trends Food Sci Technol,1999,*10*,199-204 .
- Kimura K, Ozeki M, Juneja LR, Ohira H,L-Theanine reduces psychological and physiological stress responses. *Biol Psychol.* 2007, *74*,39-45.