Researchers warn milk eliminates cardiovascular health benefits of tea

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Research published on-line (Tuesday 9 January) in *European Heart Journal* has found that the protective effect that tea has on the cardiovascular system is totally wiped out by adding milk.

Tests on volunteers showed that black tea significantly improves the ability of the arteries to relax and expand, but adding milk completely blunts the effect. Supporting tests on rat aortas (aortic rings) and endothelial (lining) cells showed that tea relaxed the aortic rings by producing nitric oxide, which promotes dilation of blood vessels. But, again, adding milk blocked the effect.

The findings, by cardiologists and scientists from the Charité Hospital, Universitätsmedizin-Berlin, Campus Mitte, Germany, are bad news for tea-drinking nations like the British, who normally add milk to their beverage. The results have led the researchers to suggest that tea drinkers who customarily add milk should consider omitting it some of the time.

Their study showed that the culprit in milk is a group of proteins called caseins, which they found interacted with the tea to decrease the concentration of catechins in the beverage. Catechins are the flavonoids in tea that mainly contribute to its protection against cardiovascular disease.

Senior researcher Dr Verena Stangl, Professor of Cardiology (Molecular Atherosclerosis) at the hospital, said: "There is a broad body of evidence from experimental and clinical studies indicating that tea exerts

antioxidative, anti-inflammatory and vasodilating effects, thereby protecting against cardiovascular diseases. As worldwide tea consumption is second only to that of water, its beneficial effects represent an important public health issue. But, up to now, it's not been known whether adding milk to tea, as widely practised in the UK and some other countries, influences these protective properties. So, we decided to investigate the effects of tea, with and without milk, on endothelial function, because that is a sensitive indicator of what is happening to blood vessels."

Sixteen healthy postmenopausal women drank either half a litre of freshly brewed black tea, black tea with 10% skimmed milk, or boiled water (as a control) on three separate occasions under the same conditions. The endothelial function of the brachial artery in the forearm was measured by high resolution ultrasound before and two hours after drinking, with measurements being taken every 15 seconds for up to two minutes a time.

Said first author Dr Mario Lorenz, a molecular biologist: "We found that, whereas drinking tea significantly increased the ability of the artery to relax and expand to accommodate increased blood flow compared with drinking water, the addition of milk completely prevents the biological effect. To extend our findings to a functional model, we determined vasodilation in rat aortic rings by exposing them to tea on its own and tea with individual milk proteins added, and got the same result."

Milk contains a number of different proteins: by testing each one separately, the researchers found that it was the three caseins that accounted for the inhibiting effect, probably by forming complexes with tea catechins.

Said Dr Stangl: "The well-established benefits of tea have been

described in many studies. Our results thus provide a possible explanation for the lack of beneficial effects of tea on the risk of heart disease in the UK, a country where milk is usually added."

She said their findings could also have implications for cancer, against which tea has also been shown to be protective. "Since milk appears to modify the biological activities of tea ingredients, it is likely that the anti-tumour effects of tea could be affected as well. I think it is essential that we re-examine the association between tea consumption and cancer protection, to see if that is the case."

Said Dr Lorenz: "It is important to bear in mind that green tea is almost exclusively drunk without milk. So we are talking only about those countries and regions where black tea is consumed and where milk is added. We certainly don't want to dismiss the consumption of black tea: the results of our study merely attempt to encourage people to consider that, while the addition of milk may improve its taste, it may also lower its health-protective properties."

Dr Stangl said that another important lesson from their research was that it was vital in nutritional studies to exclude confounding factors as far as possible. Often, the effects of a single nutritional compound or beverage such as red wine, olive oil and so on, are analysed. But, it is difficult to assign clearly the observed effects and separate them from the surrounding food matrix (such as adding milk) that may bias results. It was therefore important to collect all data accurately and include potentially confounding factors in the analysis.

Source: European Society of Cardiology