Polyphenols and health
Summary of the Heart Foundation position statement

What are polyphenols?
- Polyphenolic compounds are produced as secondary plant metabolites
- Many thousands: diverse range of functions
- 2 main classes: flavonoids and phenolic acids

Why the interest in polyphenols?
- Many polyphenolic compounds are potent antioxidants in vitro
- There is increasing evidence from population studies, RCTs and mechanistic studies that polyphenols contribute to human health

Heart Foundation position statement
Antioxidants in food, drinks and supplements for cardiovascular health
Provides recommendations for the consumption of antioxidants in food, drinks and supplements to reduce risk of cardiovascular disease
Polyphenols are the most abundant antioxidants in the human diet
Polyphenol-rich foods and beverages

Given that we consume foods and beverages, rather than nutrients, the position statement addressed potential effects of antioxidant-rich foods and drinks

- Fruit and vegetables
- Tea
- Coffee
- Cocoa / chocolate
- Red wine

Cardiovascular health outcomes

Cardiovascular events and mortality

Risk factors
- Type 2 diabetes
- Blood pressure
- Blood lipids
- Body fatness

Other outcomes related to cardiovascular disease risk
- Endothelial function
- Platelet function
- Inflammation

Fruit and vegetables

Background

- The intake of fresh fruit and vegetables are encouraged by most health authorities globally
- Fruit and vegetables are important sources of dietary fibre, minerals, vitamins and other phytochemicals
- They are often rich sources of antioxidants, including vitamin C and E, carotenoids and polyphenols
- There is evidence that fruit-derived polyphenols can improve vascular health

Conclusions

Consuming a diet rich in fruits and vegetables causes a modest fall in systolic blood pressure

Higher fruit and vegetable intakes are associated with lower risk of cardiovascular disease in populations

Each additional serve of fruit or vegetables each day is associated with a 4% lower risk for heart disease
Tea

Types of tea: green and black – 20% flavonoids

Tea often contributes 50 to 80% of total flavonoid intake

> 25 population studies

Meta-analyses

- **tea drinking** (black or green) is associated with a 10 to 20% lower risk of **heart disease** and **stroke**

Regular tea drinking is associated with reduced risk of cardiovascular disease

Cardiovascular disease

Endothelial function

**Tea and FMD: RCTs**

- **Acute**
- **Chronic**

![Tea and FMD: RCTs chart]

Ras TE et al. Plos ONE 2011
Endothelial function

Tea consumption improves endothelial function

Body fatness/visceral fatness

Two recent meta-analyses of results from human intervention studies suggest that green tea can reduce body weight and reduce waist circumference and visceral fat.

There is limited evidence that drinking green tea reduces visceral fat.

Blood pressure

Coffee

Background

• Coffee is rich in chlorogenic acids (phenolic acids)

• Often one of the most important sources of phenolic acids in the diet

• Much of the research on coffee has focused on its caffeine, but there is increasing interest in the potential health benefits of the phenolic acids in coffee

Cardiovascular disease


There is little overall impact of coffee on risk of cardiovascular disease

Blood pressure / hypertension


5 cups per day of coffee causes a small elevation in blood pressure

The role of coffee in the development of hypertension is unclear

Noordzij M et al. J Hypertens 2005; 23:921-8
Blood lipids

Boiled coffee increases total and LDL cholesterol
Filtered and instant coffee have no impact

Type 2 diabetes

Regular coffee consumption is associated with lower risk of type 2 diabetes

Cocoa / chocolate

Background

- Cocoa: one of the richest sources of flavonoids
- Cocoa: manufactured to cocoa powder and chocolate
Cardiovascular disease
There was no conclusion reached regarding chocolate and cardiovascular disease risk
At least 5 population studies
Modest regular cocoa/chocolate intake is associated with a 10 to 50% lower risk of cardiovascular outcomes

Chocolate consumption at least weekly was associated with a 25% lower risk of all CVD events.

Lewis et al. Arch Intern Med 2010; 170:1857-8

Endothelial function and Blood pressure
>10 RCTs: effect of flavonoid-rich cocoa or dark chocolate on endothelial function and BP

Meta-analysis *
Flavonoid-rich cocoa or dark chocolate can increase FMD by 1.5 to 4% (~40%) acutely and chronically
and reduce blood pressure by 6/3 mm Hg

*Hooper et al Am J Clin Nutr 2008

Blood pressure
Intake of high polyphenol cocoa and/or dark chocolate improves endothelial function
Intake of high polyphenol cocoa and/or dark chocolate can reduce systolic blood pressure

Desch et al. Am J Hypertens 2010
Cocoa / chocolate: Blood pressure

Egan et al.  
Hypertension 2010

Recommendations

The Heart Foundation encourages all Australians to:
- Consume 2 fruit and 5 vegetables daily
- Drink tea and cocoa made from raw cocoa powder

The Heart Foundation does not recommend:
- Consumption of chocolate, coffee or red wine for cardiovascular disease prevention
- The Heart Foundation supports the NHMRC guidelines of no more than 2 standard alcoholic drinks per day

Acknowledgements

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Members of the working group
Kevin Croft (UWA)  
Barbara Eden (Heart Foundation)  
Jonathan Hodgson (UWA)  
Len Kritharides (Univ. of Sydney)  
Trevor Mori (UWA)  
Roland Stocker (Univ. of Sydney)