

## The Potential anti diabetic properties of green and purple tea...

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### Diabetes overview

- Diabetes mellitus, specifically type 2 DM, is a common chronic metabolic disorder affecting approx. 10.5% of people between the ages of 20-79 globally. T2DM is associated with the metabolic syndrome (HTN, dislipidemia, hyperglycemia, obesity) and fatty liver disease.
- There are several sites or therapeutic targets to treat T2DM which are aimed at regulating insulin secretion, glucose/and or lipid metabolism.
- Often these anti-diabetic drugs are limited by adverse side effects or cost.
- Regulating blood sugar after eating is one goal of therapy; alpha-amylase and alpha-glucosidase enzymes found in GI tract mucosa are potential area of therapeutic interest.

### Tea=Medicine

- Tea has been used as traditional medicine, specifically for diabetes, in African/Asian countries for centuries
- Purple tea *Camellia sinensis* high levels of anthocyanins (135x), anthocyanidins (3.5x) and proanthocyanidins (3x)
- **Ellagitannins** (bioavailable, but limited bioaccessibility) metabolized via colonic microbiota to **urolithin A** and **urolithin B**
- Ellagitannins and urolithins have many beneficial biological activities (anti-cancer, antidiabetic, anti-inflammatory, antioxidant, and cardioprotective properties)
- Low in Western diets, mainly via red berries. Seasonal and not globally available
- Tea is affordable, available globally, and year round

**Aim of this paper is to determine if green and purple teas are a source of ellagitannins and whether these teas have antidiabetic properties via**

- *in vitro* and *in silico* alpha-glucosidase and alpha-amylase inhibition (ellagitannins)
- stimulate cellular glucose uptake and reduce lipid accumulation in fat cells and liver cells (urolithins)

### Results/Conclusions:

Purple tea more so than green tea has high concentrations of ellagitannins, urolithin A and B. These work via several mechanisms to 1) increase glucose uptake in target cells, 2) reduce fat accumulation in cells (which often happens in T2DM), and 3) reduces pancreatic inflammation (which has a causative role in occurrence of diabetes and progression of disease). The ellagitannins and urolithins were comparable to or exceeded the activity of metformin, a common and potent anti-diabetic drug.

**\*\*Limitations:** these are lab/in vitro studies that need confirmation in live animal models to draw definitive conclusions.

Reasonable to say “studies have shown strong anti-diabetic properties of compounds found in high concentrations in purple tea”.