Review

The Potent Potential of Green Tea In against Cardiac Disorders: A Comprehensive Review of Recent Discoveries

Shamima Akter , Mayank Choubey , Shahida Arbee , Mohammad Mohabbulla Mohib , Munichandra Babu Tirumalasetty , Asif Akhtar , Md Wahiduzzaman , Mohammad Sarif Mohiuddin *

Posted Date: 8 September 2023

doi: 10.20944/preprints202309.0582.v1

Keywords: Green tea; Diabetes; CVD; cardiovascular

Review

The Potent Potential of Green Tea in Against Cardiac Disorders: A Comprehensive Review of Recent Discoveries

Shamima Akter MD [1], Mayank Choubey PhD [2], Shahida Arbee MD [3], Mohammad Mohabbulla Mohib PhD [4], Munichandra Babu Tirumalasetty PhD [2], Asif Akhtar PhD [2], Md Wahiduzzaman PhD [2] and Mohammad Sarif Mohiuddin MD, PhD [2,*]

[1] Department of Internal Medicine, St. Francis—Emory Healthcare, 2122 Manchester Expressway, Columbus, GA 31904, USA
[2] Department of Foundations of Medicine, NYU Long Island School of Medicine, 101 Mineola Blvd, Mineola, NY 11501, USA.
[3] Institute for Molecular Medicine, Aichi Medical University, 1-Yazako, Karimata, Aichi, Nagakute 480-1103, Japan
[4] Julius Bernstein Institute of Physiology, Medical School, Martin Luther University of Halle-Wittenberg, Magdeburger Straße 6, 06112 Halle, Germany.
* Correspondence: sharif@gmail.com; Tel.: +1-901-336-8634

Abstract: A preventive effect for tea and its bio active components in cardiovascular health has been suggested by the results of several epidemiological studies, treatments utilizing randomized controlled trials, and mechanistic investigations. Therefore, scientific interest in green tea's ability to prevent cardiovascular diseases (CVDs) is growing. Green tea benefits for the metabolic syndrome, which includes diabetes and hypertension but may also raise cholesterol levels. Additionally, green tea reduces the mortality from any cause, arrhythmia, stroke, coronary heart disease, heart failure, and other conditions.

Keywords: green tea; diabetes; CVD; cardiovascular

Introduction: Cardiovascular diseases (CVDs) continue to be the world's leading cause of death as well as a major contributor to poor health and increased expenses for the healthcare system [1] In 2019, cardiovascular disease (CVD) was the primary factor in 9.6 million deaths among men and 8.9 million deaths among women, or about one-third of all fatalities worldwide. 6.1 million of these deaths occurred in people between the ages of 30 and 70 [2]. CVDs includes coronary artery disease (CAD), hypertension, cardiomyopathy, heart failure, atherosclerosis, dyslipidemia, hyperglycemia, strokes and transient ischemic attacks, and other related disorders [3]. Atherosclerosis is the leading cause of death from cardiovascular disease worldwide [4]. It is a thickening and hardening of the artery wall that occurs with aging and is linked to serious consequences for the cardiovascular system and other disorders [5]. Apart from age and distending pressure, identifying precise risk factors for arterial stiffening has proven to be a less clear-cut endeavor. An individual's plasma cholesterol level, specifically when it exceeds 150 mg/dL, emerges as a significant contributor to the onset and progression of atherosclerosis [6]. A common heart ailment called coronary artery disease (CAD) causes the narrowing or blockage of major blood vessels. Plaque formation in the intima of the arterial wall is the primary cause of CAD [7]. Arterial hypertension (AH) is a primary risk factor for cardiovascular disease development. The disease is expected to afflict 10% to 20% of the adult population and is responsible for 5.8% of all fatalities worldwide [8]. Natural remedies are becoming more and more popular as complementary or even primary methods of maintaining heart health, despite the fact that conventional medical treatments for cardiovascular diseases have made great progress. This change in strategy reflects a growing understanding of the substantial effect of lifestyle decisions and holistic therapies on cardiovascular health [9,10]. Herbs have been employed as

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 September 2023 doi:10.20944/preprints202309.0582.v1

medical therapies since the dawn of time, and several derivatives (for example, aspirin, reserpine, and digitalis) have become mainstays of human pharmacology. Herbal remedies for cardiovascular disorders have been used in patients suffering from congestive heart failure, systolic hypertension, angina pectoris, atherosclerosis, cerebral insufficiency, venous insufficiency, and arrhythmia [11,12].

The act of drinking tea is a widespread cultural activity that connects individuals from different parts of the world. Black Tea, Oolong Tea and Green Tea are the three major types consumed globally with Green Tea being a standout due to its polyphenolic content such as catechins [23]. Stats show that out of around 2.5 million tons produced every year worldwide approximately 20% is attributable to Green Tea. The beverage is particularly popular in Asia, North America, North Africa, and Europe [13,14]. Among its polyphenols Four types of catechins i.e., Epicatechin, Epigallocatechin, Epicatechin - 3 Gallate and EGCG are especially abundant [15].

Over time, several pieces of evidence have been there supporting the notion that habitual drinking of tea - especially green tea can lead to better health outcomes including lower risk factors for diseases like heart attack or stroke [16,17]and some cancers [18,19]. Apart from these benefits it may also help maintain oral hygiene levels [14] regulate body weight levels [20], prevent fibrosis [21,22] increasing bone mineral density [23,24] providing antiviral benefits [21,25,26] and neuroprotection properties [27–30].

In this review, we set out to discover the complex relationship between cardiovascular health and alternative remedies. We go into the world of plant-based medicines, dietary changes, physical activity, and mindfulness techniques, all of which provide potential options for preventing and controlling cardiovascular disease. We hope to shed light on the compelling potential of natural ways in protecting one's heart health by reviewing the most recent scientific studies and insights. Our journey will traverse the diverse spectrum of natural treatments, investigating their mechanisms of action, evidence-based advantages, and practical uses. We'll learn how nature's offerings, which are often steeped in old traditions, are convergent with modern scientific understanding to provide a holistic approach to cardiovascular health as we embark on this journey.

The Bioactive Components of Green Tea: Green tea is composed of 75-80% water and polyphenol components (flavanols, flavandiols, flavonoid, and phenolic acid), with catechins accounting for more than 75% of the polyphenol chemicals found in tea leaves. Catechins, epigallocatechin gallate (EGCG), and various antioxidants play pivotal roles in conferring numerous health benefits.

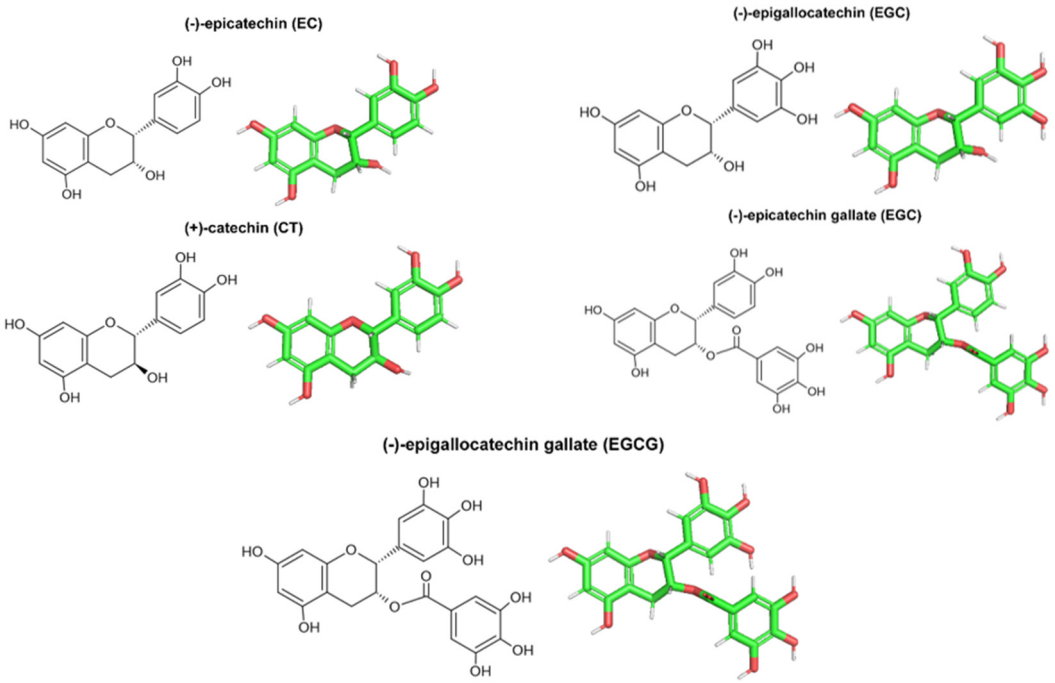

Figure. 2D and 3D molecular structures of active flavonoids of green tea.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 September 2023 doi:10.20944/preprints202309.0582.v1

Catechins: Catechins are a subclass of flavonoids, a group of polyphenolic substances that are widely present in green tea. They are mostly responsible for the bitterness and astringency of green tea. The major catechins in green tea include epicatechin (EC), epicatechin gallate (ECG), epigallocatechin (EGC), and the most abundant and bioactive of all, epigallocatechin gallate (EGCG). Catechins have strong antioxidant capabilities that aid in the neutralization of damaging free radicals in the body. They are also linked to a variety of health benefits, including cardiovascular protection, improved cholesterol levels, and anti-cancer properties .

Epigallocatechin Gallate (EGCG): EGCG is the most researched and bioactive catechin in green tea, accounting for a major amount of its health-promoting properties. EGCG is a well-known antioxidant, and it has been claimed that this flavonoid inhibits the inflammatory processes that contribute to transformation, hyperproliferation, and the onset of carcinogenesis.

Antioxidant: Antioxidants are synthetic or natural chemicals that can prevent or postpone certain types of cell damage. Green tea is a rich source of antioxidants, which contribute to its overall health benefits. Green tea's antioxidants are essential for shielding cells and tissues from oxidative damage, which is linked to a number of chronic illnesses, including cancer and cardiovascular conditions. These antioxidants may also strengthen the immune system, benefit skin health, and advance general wellness.

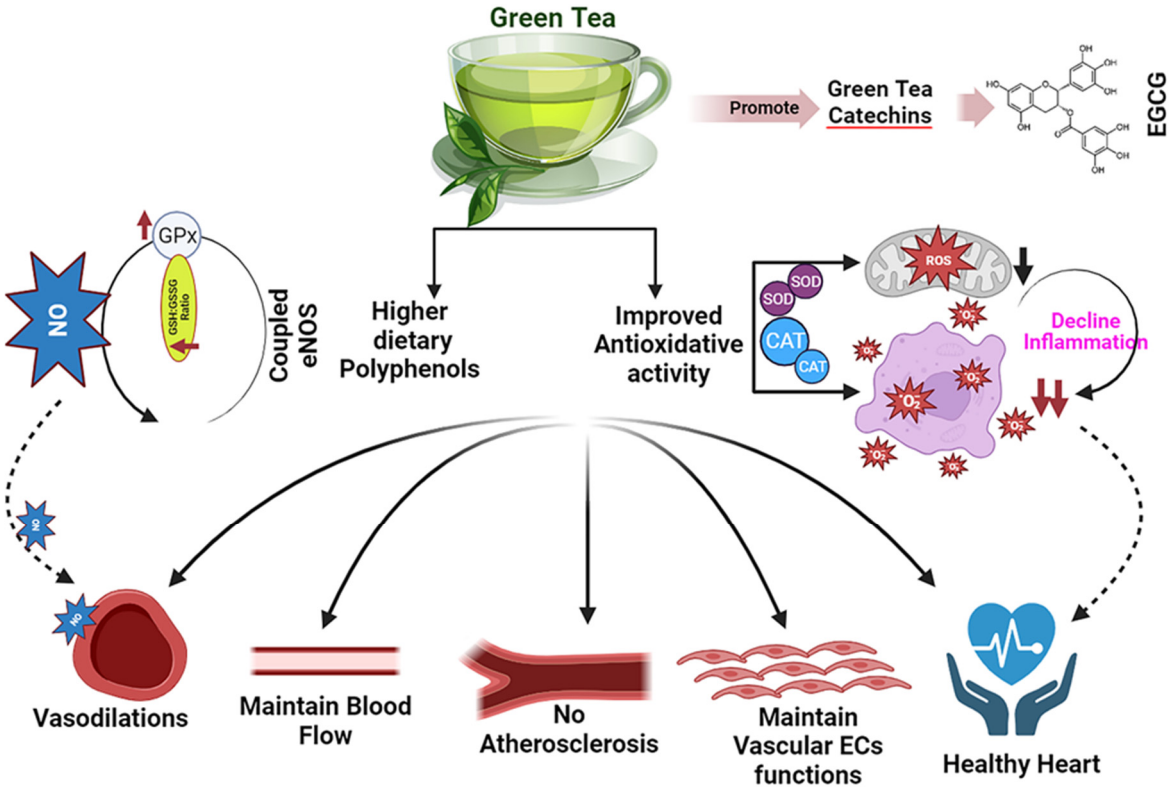

Figure. The safeguard mechanism of green tea in cardiovascular health.

Effect of Green Tea in different diseases: Studies show promising effects of green tea on obesity management by enhancing fat metabolism through suppression of adipogenesis increasing energy expenditure while also reducing food intake - but the precise molecular mechanism remains under investigation [31,32].

Data further suggests a role for increasing green tea consumption (an easily controllable lifestyle factor) in reducing the risk of cardiovascular disease (CVD) through modifications such as improved diet. This is evidenced by significant reductions in total cholesterol levels along with decreased systolic/diastolic blood pressure seen among both healthy adults and high-risk CVD patients [17].

Implicating the mechanisms behind several cancers epigenetic alterations motivated researchers to explore flavonoids' ability to reverse chromatin changes - including those found within prostate

 doi:10.20944/preprints202309.0582.v1

cancer [18]. Results show regulatory induction of oncogenes and tumor suppressor genes via enzymes like DNMT, HAT, HDAC which may help prevent and/or slow progression of cancer. Additionally, flavonoids have been shown to restore miRNA and lncRNA expression often disrupted during disease states [18]. Flavonoids have emerged as a promising natural solution for cancer prevention and treatment - including prostate cancer - due to their ability to prevent carcinogenesis and combat existing cancer cells [33,34]

A particularly compelling compound among them is EGCG - the primary catechin found within green tea which has demonstrated an ability to inhibit neutrophil elastase activity [20]. Studies have highlighted its efficacy at suppressing reactive oxygen species activity while preventing apoptosis among activated neutrophils [35,36]. EGCG was also shown to effectively limit chemokine induced neutrophil chemotaxis even at comparatively low concentrations during in vitro experiments [37]. Moreover, oral administration of both EGCG and green tea extract was found to block neutrophil mediated angiogenesis in vivo within an inflammation related angiogenesis model [38]. Finally, it is worth noting that green tea extract enhanced resolution in a pulmonary inflammation model and significantly reduced subsequent fibrosis when administered orally [39]. These findings provide strong evidence for the anti-inflammatory properties of EGCG - with significant therapeutic potential.

Research reveals that green tea catechins have properties which can inhibit proteases responsible for cancer metastasis, influenza, and HIV infections; however, adenovirus has no current viable therapies available for it at present. Therefore, scientists investigated green tea catechins specifically epigallocatechin 3 gallate (EGCG) on how it could affect both adenovirus infection as well as viral protease (adenain) by conducting research using cell cultures [40]. The study demonstrated that adding EGCG during the transition from early-stage infection to late stage resulted in highest efficiency thereby indicating inhibition of one or multiple late stages of infectious process.

Contrast media can cause kidney damage by causing the production of reactive oxygen species (ROS). However, green tea has been found to be a powerful scavenger of free radicals. In an animal study, Hamid Nasri and colleagues demonstrated the beneficial effects of green tea in preventing nephrotoxicity caused by contrast media. This suggests that green tea extract may be a safe and cost-effective intervention for patients at risk of developing nephrotoxicity when undergoing contrast media treatment [9,41].

Consumption of green tea causes low levels of intact EGCG to enter the brain parenchyma through the BBB [42,43]. This appears to promote neurite outgrowth while also preventing cognitive dysfunction. Further research suggests metabolized EGCG continues promoting neurite outgrowth even after it vanishes from our bodily systems. Through antioxidant activities like scavenging free radicals or chelating metals within our brain tissue; Polyphenols found in green tea act as powerful cognitive tools [44]. Research has shown that drinking this potent beverage can help suppress cognitive decline by delivering vital resources like antioxidants which reduce overall oxidative damage while also significantly decreasing lipid peroxidation levels within brain cells [45].

Through natural polyphenol compounds found within green teas, neuronal plasticity loss seems to reverse naturally as each endogenous antioxidant works together to improve neural growth factors while reducing neuroinflammatory pathways [46]. Additionally, these natural agents can regulate apoptosis - improving overall cell health across a wide range of damaging neurological diseases including Alzheimer's disease (AD), Multiple Sclerosis [47,48]& Parkinson's disease (PD) [49]. Most notably - EGCG within green tea catechins has been studied extensively in laboratory settings for its positive effects on reducing cellular dysfunction and death associated with inflammation, pro apoptotic protein expression and oxidative stress in the cerebral cortex. By virtue of a computational molecular docking analysis EGCG emerges as an effective inhibitor of fibrous protein accumulation [50–52].

It follows that GTCs could be employed to treat neurodegenerative disorders with great success thus paving the way for novel pharmaceutical treatments [53]. EGCG holds excellent potential as an AD treatment option when administered directly to cholinergic neurons at therapeutic levels - in addition to its widely acknowledged anti-inflammatory and antioxidative properties [54]. Brain

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 September 2023 doi:10.20944/preprints202309.0582.v1

aging is linked with oxidative damage dysregulated redox metal homeostasis and inflammation; thus, various therapeutics such as bioenergetic agents or metal complexing agents are used alongside antioxidants [50,55]. Among all dietary antioxidants available currently plant-based polyphenols (flavonoids or non-flavonoids) are by far the most promising type of nutraceutical for neutralizing stress induced free radicals and inflammation. Research conducted on both humans and animals suggests that green and black catechin flavonoids can be quite effective in protecting against brain aging while reducing risk factors associated with dementia, AD or PD [56,57]. Beyond its well-known antioxidant capabilities research suggests that green teas catechins also contribute to neuron viability by influencing cell survival genes signal transduction pathways and mitochondrial function [58,59]. As such natural compounds like green tea present an exciting possibility as a cytoprotective therapy for neurodegenerative diseases.

Green Tea's Role in Cardiovascular Health:

Numerous epidemiological studies have consistently indicated a positive association between the consumption of green tea and a reduced risk of cardiovascular disease (CVD) [60–62]. In a significant population-based study spanning 11 years from 1995 to 2005, which involved over 40,000 middle-aged Japanese individuals, the findings were striking. Those who consumed more than two cups, roughly equivalent to about 17 ounces, of green tea daily experienced a substantial reduction in their risk of cardiovascular disease-related mortality. Specifically, their risk was lowered by an impressive range of 22% to 33% when compared to individuals who consumed less than half a cup of green tea per day. This study underscores the potential protective effect of green tea against cardiovascular disease in a real-world setting [61,63–65]. Cross-sectional research found that, compared to people who consumed less than 120 ml per day, those who drank between 120 and 599 ml of green tea daily for at least a year had a 46% lower risk of hypertension and a 65% lower risk [76]. Additionally, in participants undergoing coronary angiography, a negative correlation was shown between daily consumption of more than two cups of green tea and coronary atherosclerosis [62]. Although it was said that there was no inverse relationship between consumption of green tea and coronary artery disease, consumption of green tea was discovered to be inversely related to myocardial infarction [77]. Numerous research on animals have shown that green tea has cardioprotective properties. Treatment with (10 mg/kg) EGCG in apolipoprotein E-null mice decreased the proliferation of vascular smooth muscle cells and the activation of redox-sensitive genes in vitro while increasing the antioxidant capacity of local vascular tissue and systemic circulation [78], . A group of researchers from Unilever Research Laboratorium, Vlaardingen, The Netherlands has been observed that drinking green tea appeared to lower the development of aortic lesions by 31% in hypercholesterolaemic female New Zealand white rabbits [79]. On cultures of rat cardiac myoblasts subjected to hypoxia/reoxygenation (H/R) damage, the protective effects of EGCG combined with zinc were evaluated. Three hours of hypoxia were followed by one hour of reperfusion on H9c2 cells. Prior to inducing hypoxic stress, EGCG and/or zinc were perfused. It was shown that the anti-apoptotic action was greatly increased when EGCG interacted with zinc [80]. Green tea supplementation significantly reduced atherogenesis via improved lipid metabolism as well as a direct influence on oxLDL and autophagy flux in the vessel wall. [73,81]. Another study observed, Polyphenols inhibit mitochondrial reactive oxygen species and consequent cell swelling in bEnd.3 mouse brain endothelial cells (CRL-2299) after ischemia, potentially reducing brain edema and accompanying neurological damage [82,83]. A meta-analysis included 14 eligible randomized controlled trials with 1136 participants. Green tea drinking substantially reduced TC concentration by 7.20 mg/dL (95% CI:8.19,6.21 mg/dL; P 0.001) and LDL-cholesterol concentration by 2.19 mg/dL (95% CI:3.16,1.21 mg/dL; P 0.001) [84].

Table 1. The animal study of green tea with cardioprotective effect.

Experimental Design	Result	Ref.
Rats fed a high fat diet and treated with different tea extracts for 8 weeks	Chinese green tea significantly lowered serum and hepatic cholesterol and	Yang et al. [66]

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 September 2023 doi:10.20944/preprints202309.0582.v1

	atherogenic index and increased the HDL-total cholesterol	
Sprague-Dawley rats treated with Lung Chen tea for 8 weeks	Lung Chen tea treatment dramatically reduced blood cholesterol while increasing fecal bile acid and cholesterol excretion.	Yang et al. [67]
Male SHRSP rats fed green tea polyphenols for 3 weeks.	Systolic and diastolic BP were significantly lowered	Negishi et al. [68]
Atherosclerosis-prone C57BL/6J apoprotein (apo)E-deficient mice were given an atherogenic diet supplemented with green tea extracts for 14 weeks	In the tea group, plasma lipid peroxides were decreased.	Miura et al. [69]
Apolipoprotein E-null mice, possessing both developing and well-established atherosclerotic lesions, received intraperitoneal injections of EGCG over a 42-day period.	The administration of EGCG led to an augmentation in antioxidant capacity within the vascular tissue at the local level as well as throughout the systemic circulation.	Chyu et al.[70]
Male Wistar rats treated with green tea extracts for 14 days	Tea extract reduced the area of the intima and the ratio of the intimal area to the medial area	Chen et al[71]
During a 5-week treatment period, cholesterol-fed rats were administered green tea polyphenols, and their outcomes were compared to those of rats given probucol.	Green tea polyphenols effectively suppressed LDL oxidation and concurrently increased the antioxidative activity in the serum.	Yokozawa et al. [72]
New Zealand white rabbits were fed a high-fat diet with added cholesterol and given either black tea or green tea in their drinking water for 21 weeks.	Green tea consumption showed a tendency to decrease the formation of aortic lesions, while black tea, vitamin E, and beta-carotene exhibited no discernible effects.	Tijburg et al. [14]
Male New Zealand white rabbits were provided with a hypercholesterolemic diet supplemented with green tea for a duration of 17 weeks.	The consumption of green tea resulted in a reduction in atherosclerosis and a notable decrease in the expression of VEGF (Vascular Endothelial Growth Factor) within the atherosclerotic plaque located in the rabbit aorta.	Kavantzas et al.[73]
Male Zucker rats were fed a diet consisting of 50% sucrose and 15% butter, and this diet was	The use of powdered green tea significantly reduced body weight and resulted in a notable decrease in plasma total cholesterol levels.	Hasegawa et al.[74]

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 8 September 2023 doi:10.20944/preprints202309.0582.v1

supplemented with green tea powder for a period of 10 days		
Wistar rats were provided with a diet high in cholesterol and fat, and this diet was supplemented with EGCG for a duration of 4 weeks.	In the group that was fed a diet containing 1% EGCG, there was a significant reduction in total cholesterol and LDL levels.	Raederstoff et al.[75]
Ovariectomized rats infused with green tea extracts for 8 hours.	Green tea extracts exhibited a dose-dependent reduction in the lymphatic absorption of cholesterol.	Wing Sum et al.

Mechanisms of Action: Several protective mechanisms are involved in the cardioprotective functions of green tea.

Antioxidant Properties: Free radicals are extremely active molecules created during cellular respiration and normal metabolism, and reactive oxygen species (ROS) are linked to physiological and pathological processes in animals [85]. In live animal studies, it has been demonstrated that tea polyphenols elevate the concentrations of rat serum catalase (CAT), glutathione peroxidase (GSH-Px), and superoxide dismutase (SOD), while concurrently decreasing the generation of malondialdehyde (MDA) [68,86]. These discoveries indicate that tea polyphenols play a role in modulating the oxidoreductase system, enhancing the body's antioxidative capacity, and safeguarding against oxidative stress induced by bacterial infections and intestinal damage [87].

Due to hyperglycemia and hyperlipidemia NOX1 enzyme activity and endothelial nitric oxide synthase (eNOS) uncoupling may elevated ROS levels and decreased vascular function [88,89]. Apart from the build-up of reactive oxygen species (ROS), elevated glucose levels also lead to diminished cell viability and hinder the NRF2/ARE signaling pathway. This occurs through the increased expression of KEAP1 and decreased expression of monomethyltransferase SET8 in HUVECs. Conversely, augmenting SET8 expression counteracts the inhibitory effects of high glucose on the KEAP1/NRF2/ARE pathway and endothelial oxidation [90]. NRF2 and its target genes are activated in coronary arterial endothelial cells by hyperglycemia-mediated oxidative stress, and HFD-induced vascular ROS and endothelial dysfunction are even more severe in Nfe2l2-KO mice, indicating that activation of NRF2 pathways confers endothelial protection under obesity and diabetes conditions (87)[91,92] . EGCG has been proven to activate NRF2, offering a promising new approach for the prevention and treatment of atherosclerosis. Acacetin, a natural flavone, is an anti-inflammatory and antiarrhythmic agent that is extensively used in the treatment of myocarditis [93]. EGCG may reduce myocardial oxidative stress and free fatty acid levels, hence preventing the development of heart failure in mice caused by a heart/muscle-specific deletion of manganese superoxide dismutase [94,95].

Anti-inflammatory Properties:

One essential component of green tea's cardioprotective qualities is its anti-inflammatory impact on heart function. Green tea contains bioactive chemicals, mainly catechins, which are principally responsible for this impact. In order to reduce cardiovascular system inflammation, these substances cooperate.

Pro-Inflammatory Pathways Inhibition, Green tea catechins, mainly (EGCG), have been identified to interfere with pro-inflammatory signaling pathways. Institute of Microbial Chemistry, Japan has been observed the reduction of TNF a and IL-1 in the rats treated with green tea [96], [33]. GTCs have anti-inflammatory effects in a variety of disorders by suppressing inflammatory cytokine production. EGCG reduced the production of inflammatory factors such as toll-like receptor-4, nucleic factor-B (NF- B), and inducible nitrogen oxide synthase (iNOS), as well as the release of TNF- , IL-1, and IL-6 [87].

Reduced Leukocyte Adhesion, White blood cells (leukocytes) frequently adhere to the endothelial lining of blood arteries during chronic inflammation. Green tea catechins assist to

suppress this process, preventing immune cells from accumulating in the vessel walls. This minimizes the risk of cardiac damage caused by inflammation.

Conclusion: The results of several clinical and experimental investigations as well as epidemiological data suggest that drinking green tea may have positive effects on cardiovascular health. Catechins may be the primary elements in green tea that have vascular protective properties because they are the main polyphenolic chemicals found in it.

Conflict of interest: The authors declare that they have no conflict of interest.

References

1. Vaduganathan, M.; Mensah, G.A.; Turco, J.V.; Fuster, V.; Roth, G.A. The Global Burden of Cardiovascular Diseases and Risk. *J. Am. Coll. Cardiol.* **2022**, *80*, 2361–2371, doi:10.1016/j.jacc.2022.11.005.
2. Roth, G.A.; Mensah, G.A.; Fuster, V. The Global Burden of Cardiovascular Diseases and Risks. *J. Am. Coll. Cardiol.* **2020**, *76*, 2980–2981, doi:10.1016/j.jacc.2020.11.021.
3. Smith, S.; Horgan, F.; Sexton, E.; Cowman, S.; Hickey, A.; Kelly, P.; McGee, H.; Murphy, S.; O'Neill, D.; Royston, M.; et al. The Cost of Stroke and Transient Ischaemic Attack in Ireland: A Prevalence-Based Estimate. *Age Ageing* **2012**, *41*, 332–338, doi:10.1093/ageing/afr141.
4. Kumar, R.; Malik, S.; Tiwari, R.; Zhautivova, S.B.; Rakhimovna, A.H.; Raj, T.; Kumar, P. Pathophysiology of Cardiovascular Diseases and the Role of Vitamins, and Herbal Extracts in the Reduction of Cardiovascular Risks. *Cardiovasc. Hematol. Agents Med. Chem. 19*, 175–186.
5. Mitchell, G.F.; Powell, J.T. Arteriosclerosis: A Primer for "In Focus" Reviews on Arterial Stiffness. *Arterioscler. Thromb. Vasc. Biol.* **2020**, *40*, 1025–1027, doi:10.1161/ATVBAHA.120.314208.
6. Shukla, S.K.; Gupta, S.; Ojha, S.K.; Sharma, S.B. Cardiovascular Friendly Natural Products: A Promising Approach in the Management of CVD. *Nat. Prod. Res.* **2010**, *24*, 873–898, doi:10.1080/14786410903417378.
7. Frąk, W.; Wojtasińska, A.; Lisińska, W.; Młynarska, E.; Franczyk, B.; Rysz, J. Pathophysiology of Cardiovascular Diseases: New Insights into Molecular Mechanisms of Atherosclerosis, Arterial Hypertension, and Coronary Artery Disease. *Biomedicines* **2022**, *10*, 1938, doi:10.3390/biomedicines10081938.
8. Kućmierz, J.; Frąk, W.; Młynarska, E.; Franczyk, B.; Rysz, J. Molecular Interactions of Arterial Hypertension in Its Target Organs. *Int. J. Mol. Sci.* **2021**, *22*, 9669, doi:10.3390/ijms22189669.
9. Mohabbulla Mohib, Md.; Fazla Rabby, S.M.; Paran, T.Z.; Mehedee Hasan, Md.; Ahmed, I.; Hasan, N.; Abu Taher Sagor, Md.; Mohiuddin, S. Protective Role of Green Tea on Diabetic Nephropathy—A Review. *Cogent Biol.* **2016**, *2*, 1248166, doi:10.1080/23312025.2016.1248166.
10. Wu, B.-N.; Huang, Y.-C.; Wu, H.-M.; Hong, S.-J.; Chiang, L.-C.; Chen, I.-J. A Highly Selective B1-Adrenergic Blocker with Partial B2-Agonist Activity Derived from Ferulic Acid, an Active Component of Ligusticum Wallichii Franch. *J. Cardiovasc. Pharmacol.* **1998**, *31*, 750.
11. Mohiuddin, M.S.; Himeno, T.; Yamada, Y.; Morishita, Y.; Kondo, M.; Tsunekawa, S.; Kato, Y.; Nakamura, J.; Kamiya, H. Glucagon Prevents Cytotoxicity Induced by Methylglyoxal in a Rat Neuronal Cell Line Model. *Biomolecules* **2021**, *11*, 287, doi:10.3390/biom11020287.
12. Ernst, E. Harmless Herbs? A Review of the Recent Literature. *Am. J. Med.* **1998**, *104*, 170–178, doi:10.1016/S0002-9343(97)00397-5.
13. Mohiuddin, M.S.; Himeno, T.; Inoue, R.; Miura-Yura, E.; Yamada, Y.; Nakai-Shimoda, H.; Asano, S.; Kato, M.; Motegi, M.; Kondo, M.; et al. Glucagon-Like Peptide-1 Receptor Agonist Protects Dorsal Root Ganglion Neurons against Oxidative Insult. *J. Diabetes Res.* **2019**, *2019*, 9426014, doi:10.1155/2019/9426014.
14. Chacko, S.M.; Thambi, P.T.; Kuttan, R.; Nishigaki, I. Beneficial Effects of Green Tea: A Literature Review. *Chin. Med.* **2010**, *5*, 13, doi:10.1186/1749-8546-5-13.
15. Sano, M.; Tabata, M.; Suzuki, M.; Degawa, M.; Miyase, T.; Maeda-Yamamoto, M. Simultaneous Determination of Twelve Tea Catechins by High-Performance Liquid Chromatography with Electrochemical Detection. *The Analyst* **2001**, *126*, 816–820, doi:10.1039/b102541b.
16. Ruddarraju, R.R.; Murugulla, A.C.; Kotla, R.; Chandra Babu Tirumalasetty, M.; Wudayagiri, R.; Donthabakthuni, S.; Maroju, R.; Baburao, K.; Parasa, L.S. Design, Synthesis, Anticancer, Antimicrobial Activities and Molecular Docking Studies of Theophylline Containing Acetylenes and Theophylline Containing 1,2,3-Triazoles with Variant Nucleoside Derivatives. *Eur. J. Med. Chem.* **2016**, *123*, 379–396, doi:10.1016/j.ejmech.2016.07.024.

17. Hartley, L.; Flowers, N.; Holmes, J.; Clarke, A.; Stranges, S.; Hooper, L.; Rees, K. Green and Black Tea for the Primary Prevention of Cardiovascular Disease. *Cochrane Database Syst. Rev.* **2013**, *2013*, CD009934, doi:10.1002/14651858.CD009934.pub2.
18. Izzo, S.; Naponelli, V.; Bettuzzi, S. Flavonoids as Epigenetic Modulators for Prostate Cancer Prevention. *Nutrients* **2020**, *12*, 1010, doi:10.3390/nu12041010.
19. Hayakawa, S.; Ohishi, T.; Miyoshi, N.; Oishi, Y.; Nakamura, Y.; Isemura, M. Anti-Cancer Effects of Green Tea Epigallocatchin-3-Gallate and Coffee Chlorogenic Acid. *Mol. Basel Switz.* **2020**, *25*, 4553, doi:10.3390/molecules25194553.
20. Jurgens, T.; Whelan, A.M. Can Green Tea Preparations Help with Weight Loss? *Can. Pharm. J. CPJ* **2014**, *147*, 159–160, doi:10.1177/1715163514528668.
21. Wahiduzzaman, M.; Ota, A.; Hosokawa, Y. Novel Mechanistic Insights into the Anti-Cancer Mode of Arsenic Trioxide. *Curr. Cancer Drug Targets* **2020**, *20*, 115–129.
22. Veerman, G.D.M.; van der Werff, S.C.; Koolen, S.L.W.; Miedema, J.R.; Oomen-de Hoop, E.; van der Mark, S.C.; Chandoesing, P.P.; de Bruijn, P.; Wijsenbeek, M.S.; Mathijssen, R.H.J. The Influence of Green Tea Extract on Nintedanib's Bioavailability in Patients with Pulmonary Fibrosis. *Biomed. Pharmacother.* **2022**, *151*, 113101, doi:10.1016/j.biopha.2022.113101.
23. Motegi, M.; Himeno, T.; Nakai-Shimoda, H.; Inoue, R.; Ozeki, N.; Hayashi, Y.; Sasajima, S.; Mohiuddin, M.S.; Asano-Hayami, E.; Kato, M.; et al. Deficiency of Glucagon Gene-Derived Peptides Induces Peripheral Polyneuropathy in Mice. *Biochem. Biophys. Res. Commun.* **2020**, *532*, 47–53, doi:10.1016/j.bbrc.2020.08.007.
24. Shen, C.-L.; Yeh, J.K.; Cao, J.; Wang, J.-S. Green Tea and Bone Metabolism. *Nutr. Res. N. Y. N* **2009**, *29*, 437–456, doi:10.1016/j.nutres.2009.06.008.
25. Karnan, S.; Hanamura, I.; Ota, A.; Takasugi, S.; Nakamura, A.; Takahashi, M.; Uchino, K.; Murakami, S.; Wahiduzzaman, M.; Quang Vu, L. CD52 Is a Novel Target for the Treatment of FLT3-ITD-Mutated Myeloid Leukemia. *Cell Death Discov.* **2021**, *7*, 121.
26. Liu, J.; Bodnar, B.H.; Meng, F.; Khan, A.I.; Wang, X.; Saribas, S.; Wang, T.; Lohani, S.C.; Wang, P.; Wei, Z.; et al. Epigallocatechin Gallate from Green Tea Effectively Blocks Infection of SARS-CoV-2 and New Variants by Inhibiting Spike Binding to ACE2 Receptor. *Cell Biosci.* **2021**, *11*, 168, doi:10.1186/s13578-021-00680-8.
27. Munichandrababu, T.; Bhaskar, B.V.; Ravi, S.; Bhuvaneswar, C.; Rajendra, W. Structure Based Virtual Screening of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) against RNA-Binding Motif 6 (RBM6) Involved in Human Lung Cancer. *Med. Chem. Res.* **2013**, *22*, 2828–2839, doi:10.1007/s00044-012-0276-7.
28. Mandel, S.A.; Weinreb, O.; Amit, T.; Youdim, M.B.H. Molecular Mechanisms of the Neuroprotective/Neurorescue Action of Multi-Target Green Tea Polyphenols. *Front. Biosci. Sch. Ed.* **2012**, *4*, 581–598, doi:10.2741/S286.
29. Babu, T.M.C.; Rammohan, A.; Baki, V.B.; Devi, S.; Gunasekar, D.; Rajendra, W. Development of Novel HER2 Inhibitors against Gastric Cancer Derived from Flavonoid Source of Syzygium Alternifolium through Molecular Dynamics and Pharmacophore-Based Screening. *Drug Des. Devel. Ther.* **2016**, *10*, 3611–3632, doi:10.2147/DDDT.S111914.
30. Babu, T.M.C.; Siva Rajesh, S.; Vijaya Bhaskar, B.; Devi, S.; Rammohan, A.; Sivaraman, T.; Rajendra, W. Molecular Docking, Molecular Dynamics Simulation, Biological Evaluation and 2D QSAR Analysis of Flavonoids from Syzygium Alternifolium as Potent Anti- Helicobacter Pylori Agents. *RSC Adv.* **2017**, *7*, 18277–18292, doi:10.1039/C6RA27872H.
31. Karnan, S.; Ota, A.; Murakami, H.; Rahman, M.L.; Hasan, M.N.; Wahiduzzaman, M.; Hanamura, I.; Quang Vu, L.; Inoko, A.; Hyodo, T.; et al. Identification of CD24 as a Potential Diagnostic and Therapeutic Target for Malignant Pleural Mesothelioma. *Cell Death Discov.* **2020**, *6*, 1–14, doi:10.1038/s41420-020-00364-1.
32. Huang, J.; Wang, Y.; Xie, Z.; Zhou, Y.; Zhang, Y.; Wan, X. The Anti-Obesity Effects of Green Tea in Human Intervention and Basic Molecular Studies. *Eur. J. Clin. Nutr.* **2014**, *68*, 1075–1087, doi:10.1038/ejcn.2014.143.
33. Barua, R.; Sultana, S.; Talukder, M.E.U.; Chakma, K.; Hasan, C.M.M.; Islam, M.S. Antioxidant and Cytotoxic Activity of Crude Flavonoid Fraction from the Fruits of Hybrid Variety of Momordica Charantia (Bitter Gourd). *J. Pharm. Res. Int.* **2014**, 778–786, doi:10.9734/BJPR/2014/7288.
34. Abe, S.K.; Inoue, M. Green Tea and Cancer and Cardiometabolic Diseases: A Review of the Current Epidemiological Evidence. *Eur. J. Clin. Nutr.* **2021**, *75*, 865–876, doi:10.1038/s41430-020-00710-7.

35. Barua, R.; Mizuno, K.; Tashima, Y.; Ogawa, M.; Takeuchi, H.; Taguchi, A.; Okajima, T. Bioinformatics and Functional Analyses Implicate Potential Roles for EOGT and L-Fringe in Pancreatic Cancers. *Mol. Basel Switz.* **2021**, *26*, 882, doi:10.3390/molecules26040882.
36. Neutrophil Restraint by Green Tea: Inhibition of Inflammation, Associated Angiogenesis, and Pulmonary Fibrosis1 | The Journal of Immunology | American Association of Immunologists Available online: https://journals.aai.org/jimmunol/article/170/8/4335/71635/Neutrophil-Restraint-by-Green-Tea-Inhibition-of (accessed on 5 September 2023).
37. Farhan, M. Green Tea Catechins: Nature's Way of Preventing and Treating Cancer. *Int. J. Mol. Sci.* **2022**, *23*, 10713, doi:10.3390/ijms231810713.
38. Leong, H.; Mathur, P.S.; Greene, G.L. Green Tea Catechins Inhibit Angiogenesis through Suppression of STAT3 Activation. *Breast Cancer Res. Treat.* **2009**, *117*, 505–515, doi:10.1007/s10549-008-0196-x.
39. Adamcakova, J.; Balentova, S.; Barosova, R.; Hanusrichterova, J.; Mikolka, P.; Prso, K.; Mokry, J.; Tatarkova, Z.; Kalenska, D.; Mokra, D. Effects of Green Tea Polyphenol Epigallocatechin-3-Gallate on Markers of Inflammation and Fibrosis in a Rat Model of Pulmonary Silicosis. *Int. J. Mol. Sci.* **2023**, *24*, 1857, doi:10.3390/ijms24031857.
40. Xu, J.; Xu, Z.; Zheng, W. A Review of the Antiviral Role of Green Tea Catechins. *Mol. J. Synth. Chem. Nat. Prod. Chem.* **2017**, *22*, 1337, doi:10.3390/molecules22081337.
41. Ben Saad, A.; Ncib, S.; Rjeibi, I.; Saidi, I.; Zouari, N. Nephroprotective and Antioxidant Effect of Green Tea (Camellia Sinensis) against Nicotine-Induced Nephrotoxicity in Rats and Characterization of Its Bioactive Compounds by HPLC-DAD. *Appl. Physiol. Nutr. Metab. Physiol. Appl. Nutr. Metab.* **2019**, *44*, 1134–1140, doi:10.1139/apnm-2017-0834.
42. Choubey, M. Growth Hormone and Insulin-like Growth Factor-I: Novel Insights into the Male Reproductive Health. In *Growth Disorders and Acromegaly*; IntechOpen, 2020 ISBN 978-1-83880-584-5.
43. Pervin, M.; Unno, K.; Nakagawa, A.; Takahashi, Y.; Iguchi, K.; Yamamoto, H.; Hoshino, M.; Hara, A.; Takagaki, A.; Nanjo, F.; et al. Blood Brain Barrier Permeability of (−)-Epigallocatechin Gallate, Its Proliferation-Enhancing Activity of Human Neuroblastoma SH-SY5Y Cells, and Its Preventive Effect on Age-Related Cognitive Dysfunction in Mice. *Biochem. Biophys. Rep.* **2017**, *9*, 180–186, doi:10.1016/j.bbrep.2016.12.012.
44. Mancini, E.; Beglinger, C.; Drewe, J.; Zanchi, D.; Lang, U.E.; Borgwardt, S. Green Tea Effects on Cognition, Mood and Human Brain Function: A Systematic Review. *Phytomedicine Int. J. Phytother. Phytopharm.* **2017**, *34*, 26–37, doi:10.1016/j.phymed.2017.07.008.
45. Arab, H.; Mahjoub, S.; Hajian-Tilaki, K.; Moghadasi, M. The Effect of Green Tea Consumption on Oxidative Stress Markers and Cognitive Function in Patients with Alzheimer's Disease: A Prospective Intervention Study. *Casp. J. Intern. Med.* **2016**, *7*, 188–194.
46. Farkhondeh, T.; Pourbagher-Shahri, A.M.; Ashrafizadeh, M.; Folgado, S.L.; Rajabpour-Sanati, A.; Khazdair, M.R.; Samarghandian, S. Green Tea Catechins Inhibit Microglial Activation Which Prevents the Development of Neurological Disorders. *Neural Regen. Res.* **2020**, *15*, 1792–1798, doi:10.4103/1673-5374.280300.
47. Choubey, M.; Ranjan, A.; Bora, P.S.; Baltazar, F.; Krishna, A. Direct Actions of Adiponectin on Changes in Reproductive, Metabolic, and Anti-Oxidative Enzymes Status in the Testis of Adult Mice. *Gen. Comp. Endocrinol.* **2019**, *279*, 1–11, doi:10.1016/j.ygcen.2018.06.002.
48. Semnani, M.; Mashayekhi, F.; Azarnia, M.; Salehi, Z. Effects of Green Tea Epigallocatechin-3-Gallate on the Proteolipid Protein and Oligodendrocyte Transcription Factor 1 Messenger RNA Gene Expression in a Mouse Model of Multiple Sclerosis. *Folia Neuropathol.* **2017**, *55*, 199–205, doi:10.5114/fn.2017.70484.
49. Malar, D.S.; Prasanth, M.I.; Brimson, J.M.; Sharika, R.; Sivamaruthi, B.S.; Chaiyasut, C.; Tencomnao, T. Neuroprotective Properties of Green Tea (Camellia Sinensis) in Parkinson's Disease: A Review. *Molecules* **2020**, *25*, 3926, doi:10.3390/molecules25173926.
50. Choubey, M.; Ranjan, A.; Krishna, A. Adiponectin/AdipoRs Signaling as a Key Player in Testicular Aging and Associated Metabolic Disorders. *Vitam. Horm.* **2021**, *115*, 611–634, doi:10.1016/bs.vh.2020.12.024.
51. Ma, X.; Ryu, G. Effects of Green Tea Contents on the Quality and Antioxidant Properties of Textured Vegetable Protein by Extrusion-Cooking. *Food Sci. Biotechnol.* **2018**, *28*, 67–74, doi:10.1007/s10068-018-0437-7.

52. Choubey, M.; Ranjan, A.; Bora, P.S.; Krishna, A. Protective Role of Adiponectin against Testicular Impairment in High-Fat Diet/Streptozotocin-Induced Type 2 Diabetic Mice. *Biochimie* **2020**, *168*, 41–52, doi:10.1016/j.biochi.2019.10.014.
53. Pervin, M.; Unno, K.; Ohishi, T.; Tanabe, H.; Miyoshi, N.; Nakamura, Y. Beneficial Effects of Green Tea Catechins on Neurodegenerative Diseases. *Mol. J. Synth. Chem. Nat. Prod. Chem.* **2018**, *23*, 1297, doi:10.3390/molecules23061297.
54. Nugala, B.; Namasi, A.; Emmadi, P.; Krishna, P.M. Role of Green Tea as an Antioxidant in Periodontal Disease: The Asian Paradox. *J. Indian Soc. Periodontol.* **2012**, *16*, 313–316, doi:10.4103/0972-124X.100902.
55. Akbarialiabad, H.; Dahroud, M.D.; Khazaei, M.M.; Razmeh, S.; Zarshenas, M.M. Green Tea, A Medicinal Food with Promising Neurological Benefits. *Curr. Neuropharmacol.* **2021**, *19*, 349–359, doi:10.2174/1570159X18666200529152625.
56. Neuroprotective Effect of Green Tea Extractives against Oxidative Stress by Enhancing the Survival and Proliferation of PC12 Cells | SpringerLink Available online: https://link.springer.com/article/10.1007/s13273-019-0042-8 (accessed on 5 September 2023).
57. Okello, E.J.; Mather, J. Comparative Kinetics of Acetyl- and Butyryl-Cholinesterase Inhibition by Green Tea Catechins | Relevance to the Symptomatic Treatment of Alzheimer's Disease. *Nutrients* **2020**, *12*, 1090, doi:10.3390/nu12041090.
58. Akter, S.; Tasnim, S.; Barua, R.; Choubey, M.; Arbee, S.; Mohib, M.M.; Minhaz, N.; Choudhury, A.; Sarker, P.; Mohiuddin, M.S. The Effect of COVID-19 on Gut Microbiota: Exploring the Complex Interplay and Implications for Human Health. *Gastrointest. Disord.* **2023**, *5*, 340–355, doi:10.3390/gidisord5030028.
59. Weinreb, O.; Mandel, S.; Amit, T.; Youdim, M.B.H. Neurological Mechanisms of Green Tea Polyphenols in Alzheimer's and Parkinson's Diseases. *J. Nutr. Biochem.* **2004**, *15*, 506–516, doi:10.1016/j.jnutbio.2004.05.002.
60. Imai, K.; Nakachi, K. Cross Sectional Study of Effects of Drinking Green Tea on Cardiovascular and Liver Diseases. *BMJ* **1995**, *310*, 693–696, doi:10.1136/bmj.310.6981.693.
61. Kuriyama, S.; Shimazu, T.; Ohmori, K.; Kikuchi, N.; Nakaya, N.; Nishino, Y.; Tsubono, Y.; Tsuji, I. Green Tea Consumption and Mortality Due to Cardiovascular Disease, Cancer, and All Causes in Japan: The Ohsaki Study. *JAMA* **2006**, *296*, 1255–1265, doi:10.1001/jama.296.10.1255.
62. Sasazuki, S.; Kodama, H.; Yoshimasu, K.; Liu, Y.; Washio, M.; Tanaka, K.; Tokunaga, S.; Kono, S.; Arai, H.; Doi, Y.; et al. Relation between Green Tea Consumption and the Severity of Coronary Atherosclerosis among Japanese Men and Women. *Ann. Epidemiol.* **2000**, *10*, 401–408, doi:10.1016/s1047-2797(00)00066-1.
63. Dai, W.; Choubey, M.; Patel, S.; Singer, H.A.; Ozcan, L. Adipocyte CAMK2 Deficiency Improves Obesity-Associated Glucose Intolerance. *Mol. Metab.* **2021**, *53*, 101300, doi:10.1016/j.molmet.2021.101300.
64. Akter, S.; Choubey, M.; Mohib, M.M.; Arbee, S.; Sagor, M.A.T.; Mohiuddin, M.S. Stem Cell Therapy in Diabetic Polyneuropathy: Recent Advancements and Future Directions. *Brain Sci.* **2023**, *13*, 255, doi:10.3390/brainsci13020255.
65. Akter, S.; Choubey, M.; Arbee, S.; Mohib, M.M.; Tirumalasetty, M.B.; Minhaz, N.; Biswas, M.; Mohiuddin, M.S. Safeguarding Intimate Health: Decoding the Interplay of Diabetes and Erectile Dysfunction 2023.
66. Yang, M.-H.; Wang, C.-H.; Chen, H.-L. Green, Oolong and Black Tea Extracts Modulate Lipid Metabolism in Hyperlipidemia Rats Fed High-Sucrose Diet. *J. Nutr. Biochem.* **2001**, *12*, 14–20, doi:10.1016/s0955-2863(00)00140-6.
67. Gu, Q.; Chen, F.; Chen, N.; Wang, J.; Li, Z.; Deng, X. Effect of EGCG on Bronchial Epithelial Cell Premalignant Lesions Induced by Cigarette Smoke and on Its CYP1A1 Expression. *Int. J. Mol. Med.* **2021**, *48*, 220, doi:10.3892/ijmm.2021.5053.
68. Negishi, H.; Xu, J.-W.; Ikeda, K.; Njelekela, M.; Nara, Y.; Yamori, Y. Black and Green Tea Polyphenols Attenuate Blood Pressure Increases in Stroke-Prone Spontaneously Hypertensive Rats. *J. Nutr.* **2004**, *134*, 38–42, doi:10.1093/jn/134.1.38.
69. Tea Catechins Prevent the Development of Atherosclerosis in Apoprotein E–Deficient Mice - ScienceDirect Available online: https://www.sciencedirect.com/science/article/pii/S0022316622144536 (accessed on 7 September 2023).
70. Wang, W.; Zhang, Z.-Z.; Wu, Y.; Wang, R.-Q.; Chen, J.-W.; Chen, J.; Zhang, Y.; Chen, Y.-J.; Geng, M.; Xu, Z.-D.; et al. (–)-Epigallocatechin-3-Gallate Ameliorates Atherosclerosis and Modulates Hepatic Lipid Metabolic Gene Expression in Apolipoprotein E Knockout Mice: Involvement of TTC39B. *Front. Pharmacol.* **2018**, *9*, 195, doi:10.3389/fphar.2018.00195.

71. Chan, P.C.; Ramot, Y.; Malarkey, D.E.; Blackshear, P.; Kissling, G.E.; Travlos, G.; Nyska, A. Fourteen-Week Toxicity Study of Green Tea Extract in Rats and Mice. *Toxicol. Pathol.* **2010**, *38*, 1070, doi:10.1177/0192623310382437.
72. Yokozawa, T.; Noh, J.S.; Park, C.H. Green Tea Polyphenols for the Protection against Renal Damage Caused by Oxidative Stress. *Evid.-Based Complement. Altern. Med. ECAM* **2012**, *2012*, 845917, doi:10.1155/2012/845917.
73. Ding, S.; Jiang, J.; Yu, P.; Zhang, G.; Zhang, G.; Liu, X. Green Tea Polyphenol Treatment Attenuates Atherosclerosis in High-Fat Diet-Fed Apolipoprotein E-Knockout Mice via Alleviating Dyslipidemia and up-Regulating Autophagy. *PLOS ONE* **2017**, *12*, e0181666, doi:10.1371/journal.pone.0181666.
74. SUZUKI, Y.; MIYOSHI, N.; ISEMURA, M. Health-Promoting Effects of Green Tea. *Proc. Jpn. Acad. Ser. B Phys. Biol. Sci.* **2012**, *88*, 88–101, doi:10.2183/pjab.88.88.
75. Bun, S.S.; Bun, H.; Guédon, D.; Rosier, C.; Ollivier, E. Effect of Green Tea Extracts on Liver Functions in Wistar Rats. *Food Chem. Toxicol. Int. J. Publ. Br. Ind. Biol. Res. Assoc.* **2006**, *44*, 1108–1113, doi:10.1016/j.fct.2006.01.006.
76. Yang, Y.-C.; Lu, F.-H.; Wu, J.-S.; Wu, C.-H.; Chang, C.-J. The Protective Effect of Habitual Tea Consumption on Hypertension. *Arch. Intern. Med.* **2004**, *164*, 1534–1540, doi:10.1001/archinte.164.14.1534.
77. Hirano, R.; Momiyama, Y.; Takahashi, R.; Taniguchi, H.; Kondo, K.; Nakamura, H.; Ohsuzu, F. Comparison of Green Tea Intake in Japanese Patients with and without Angiographic Coronary Artery Disease. *Am. J. Cardiol.* **2002**, *90*, 1150–1153, doi:10.1016/s0002-9149(02)02787-x.
78. Chyu, K.-Y.; Babbidge, S.M.; Zhao, X.; Dandillaya, R.; Rietveld, A.G.; Yano, J.; Dimayuga, P.; Cercek, B.; Shah, P.K. Differential Effects of Green Tea-Derived Catechin on Developing versus Established Atherosclerosis in Apolipoprotein E-Null Mice. *Circulation* **2004**, *109*, 2448–2453, doi:10.1161/01.CIR.0000128034.70732.C2.
79. Tijburg, L.B.; Wiseman, S.A.; Meijer, G.W.; Weststrate, J.A. Effects of Green Tea, Black Tea and Dietary Lipophilic Antioxidants on LDL Oxidizability and Atherosclerosis in Hypercholesterolaemic Rabbits. *Atherosclerosis* **1997**, *135*, 37–47, doi:10.1016/s0021-9150(97)00139-1.
80. Zeng, X.; Tan, X. Epigallocatechin-3-gallate and Zinc Provide Anti-apoptotic Protection against Hypoxia/Reoxygenation Injury in H9c2 Rat Cardiac Myoblast Cells. *Mol. Med. Rep.* **2015**, *12*, 1850–1856, doi:10.3892/mmr.2015.3603.
81. Ranjan, A.; Choubey, M.; Yada, T.; Krishna, A. Immunohistochemical Localization and Possible Functions of Nesfatin-1 in the Testis of Mice during Pubertal Development and Sexual Maturation. *J. Mol. Histol.* **2019**, *50*, 533–549, doi:10.1007/s10735-019-09846-8.
82. Singh, A.; Choubey, M.; Bora, P.; Krishna, A. Adiponectin and Chemerin: Contrary Adipokines in Regulating Reproduction and Metabolic Disorders. *Reprod. Sci. Thousand Oaks Calif* **2018**, *25*, 1462–1473, doi:10.1177/1933719118770547.
83. Ks, P.; B, Q.; Ra, A. Ischemia-Induced Endothelial Cell Swelling and Mitochondrial Dysfunction Are Attenuated by Cinnamtannin D1, Green Tea Extract, and Resveratrol in Vitro. *Nutr. Neurosci.* **2015**, *18*, doi:10.1179/1476830514Y.0000000127.
84. Zheng, X.-X.; Xu, Y.-L.; Li, S.-H.; Liu, X.-X.; Hui, R.; Huang, X.-H. Green Tea Intake Lowers Fasting Serum Total and LDL Cholesterol in Adults: A Meta-Analysis of 14 Randomized Controlled Trials1234. *Am. J. Clin. Nutr.* **2011**, *94*, 601–610, doi:10.3945/ajcn.110.010926.
85. Yan, Z.; Zhong, Y.; Duan, Y.; Chen, Q.; Li, F. Antioxidant Mechanism of Tea Polyphenols and Its Impact on Health Benefits. *Anim. Nutr.* **2020**, *6*, 115–123, doi:10.1016/j.aninu.2020.01.001.
86. Ahmed, N.A.; Radwan, N.M.; Aboul Ezz, H.S.; Salama, N.A. The Antioxidant Effect of Green Tea Mega EGCG against Electromagnetic Radiation-Induced Oxidative Stress in the Hippocampus and Striatum of Rats. *Electromagn. Biol. Med.* **2017**, *36*, 63–73, doi:10.1080/15368378.2016.1194292.
87. Zhang, L.; Gui, S.; Wang, J.; Chen, Q.; Zeng, J.; Liu, A.; Chen, Z.; Lu, X. Oral Administration of Green Tea Polyphenols (TP) Improves Ileal Injury and Intestinal Flora Disorder in Mice with Salmonella Typhimurium Infection via Resisting Inflammation, Enhancing Antioxidant Action and Preserving Tight Junction. *J. Funct. Foods* **2020**, *64*, 103654, doi:10.1016/j.jff.2019.103654.
88. da Costa, R.M.; Fais, R.S.; Dechandt, C.R.P.; Louzada-Junior, P.; Alberici, L.C.; Lobato, N.S.; Tostes, R.C. Increased Mitochondrial ROS Generation Mediates the Loss of the Anti-Contractile Effects of Perivascular Adipose Tissue in High-Fat Diet Obese Mice. *Br. J. Pharmacol.* **2017**, *174*, 3527–3541, doi:10.1111/bph.13687.

89. Youn, J.Y.; Gao, L.; Cai, H. The P47phox- and NADPH Oxidase Organiser 1 (NOXO1)-Dependent Activation of NADPH Oxidase 1 (NOX1) Mediates Endothelial Nitric Oxide Synthase (ENOS) Uncoupling and Endothelial Dysfunction in a Streptozotocin-Induced Murine Model of Diabetes. *Diabetologia* **2012**, *55*, 2069–2079, doi:10.1007/s00125-012-2557-6.
90. Chen, X.; Qi, J.; Wu, Q.; Jiang, H.; Wang, J.; Chen, W.; Mao, A.; Zhu, M. High Glucose Inhibits Vascular Endothelial Keap1/Nrf2/ARE Signal Pathway via Downregulation of Monomethyltransferase SET8 Expression. *Acta Biochim. Biophys. Sin.* **2020**, *52*, 506–516, doi:10.1093/abbs/gmaa023.
91. Najnin, R.A.; Shafrin, F.; Polash, A.H.; Zaman, A.; Hossain, A.; Taha, T.; Ahmed, R.; Tuli, J.F.; Barua, R.; Sajib, A.A.; et al. A Diverse Community of Jute (Corchorus Spp.) Endophytes Reveals Mutualistic Host–Microbe Interactions. *Ann. Microbiol.* **2015**, *65*, 1615–1626, doi:10.1007/s13213-014-1001-1.
92. da Costa, R.M.; Rodrigues, D.; Pereira, C.A.; Silva, J.F.; Alves, J.V.; Lobato, N.S.; Tostes, R.C. Nrf2 as a Potential Mediator of Cardiovascular Risk in Metabolic Diseases. *Front. Pharmacol.* **2019**, *10*.
93. Yang, X.-J.; Liu, F.; Feng, N.; Ding, X.-S.; Chen, Y.; Zhu, S.-X.; Yang, L.-C.; Feng, X.-F. Berberine Attenuates Cholesterol Accumulation in Macrophage Foam Cells by Suppressing AP-1 Activity and Activation of the Nrf2/HO-1 Pathway. *J. Cardiovasc. Pharmacol.* **2020**, *75*, 45, doi:10.1097/FJC.0000000000000769.
94. Talukder, Md.E.U.; Momen, F.; Barua, R.; Sultana, S.; Yesmin, F.; Islam, M.S.; Bhuiyan, R.H. In Vitro Assessment of Cytotoxic Activity of Hybrid Variety of Momordica Charantia (Bitter Gourd). *J. Phytopharm.* **2020**, *9*, 445–448, doi:10.31254/phyto.2020.9611.
95. Oyama, J.-I.; Shiraki, A.; Nishikido, T.; Maeda, T.; Komoda, H.; Shimizu, T.; Makino, N.; Node, K. EGCG, a Green Tea Catechin, Attenuates the Progression of Heart Failure Induced by the Heart/Muscle-Specific Deletion of MnSOD in Mice. *J. Cardiol.* **2017**, *69*, 417–427, doi:10.1016/j.jjcc.2016.05.019.
96. Ohishi, T.; Goto, S.; Monira, P.; Isemura, M.; Nakamura, Y. Anti-Inflammatory Action of Green Tea. *Anti-Inflamm. Anti-Allergy Agents Med. Chem. 15*, 74–90.
97. Najnin, R.A.; Shafrin, F.; Polash, A.H.; Zaman, A.; Hossain, A.; Taha, T.; Ahmed, R.; Tuli, J.F.; Barua, R.; Sajib, A.A.; et al. A Diverse Community of Jute (Corchorus Spp.) Endophytes Reveals Mutualistic Host–Microbe Interactions. *Ann. Microbiol.* **2015**, *65*, 1615–1626, doi:10.1007/s13213-014-1001-1.
98. Ohishi, T.; Kishimoto, Y.; Miura, N.; Shiota, G.; Kohri, T.; Hara, Y.; Hasegawa, J.; Isemura, M. Synergistic Effects of (-)-Epigallocatechin Gallate with Sulindac against Colon Carcinogenesis of Rats Treated with Azoxymethane. *Cancer Lett.* **2002**, *177*, 49–56, doi:10.1016/s0304-3835(01)00767-4.