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**PEER REVIEWED STUDIES**

**Cognitive Health**

**Neural effects of green tea extract on dorsolateral prefrontal cortex**

**ABSTRACT**

**Background/Objectives:**
Green tea is being recognized as a beverage with potential benefits for human health and cognitive functions. In vivo studies provide preliminary evidence that green tea intake may have a positive role in improving effects on cognitive functions. We aimed to examine the neural effects of green tea extract on brain activation in humans.

**Subjects/Methods:**
Functional magnetic resonance imaging was recorded while 12 healthy volunteers performed a working memory task following administration of 250 or 500 ml of a milk whey based green tea containing soft drink or milk whey based soft drink without green tea as control in a double-blind, controlled repeated measures within-subject design with counterbalanced order of substance administration. A whole-brain analysis with a cluster-level threshold of P<0.001 (unadjusted) was followed by an alpha-error (FWE) adjustment for multiple comparisons.

**Results:**
Whole-brain analyses revealed no significant effects after correction for multiple comparisons (FWE P<0.05). Using a ROI approach, green tea extract increased activation in the DLPFC relative to a control condition (FWE P<0.001). This neural effect was related to green tea dosage. Green tea extract was not associated with any significant attenuation in regional activation relative to control condition.

**Conclusions:**
These data suggest that green tea extract may modulate brain activity in the DLPFC, a key area that mediates working memory processing in the human brain. Moreover, this is the first neuroimaging study implicating that functional neuroimaging methods provide a means of examining how green tea extract acts on the brain.

**Source**

**A combination of green tea extract and L-theanine improve memory and attention in subjects with mild cognitive impairment: A double blind placebo controlled study**

**ABSTRACT**
A combination of green tea extract and L-theanine (LGNC-07) has been reported to have beneficial effects on cognition in animal studies. In this randomized, double-blind, placebo-controlled study, the effect of LGNC-07 on memory and attention in subjects with mild cognitive impairment (MCI) was investigated. Ninety-one MCI subjects whose Mini Mental State Examination-K (MMSE-K) scores were between 21 and 26 and who were in either stage 2 or 3 on the Global Deterioration Scale were enrolled in this study. The treatment group (13 men, 32 women; 57.58 ± 9.45 years) took 1,680 mg of LGNC-07, and the placebo group (12 men, 34 women; 56.28 ± 9.92 years) received an equivalent amount of multilactoside and lactose for 16 weeks. Neuropsychological tests (Rey–Kim memory test and Stroop color–word test) and electroencephalography were conducted to evaluate the effect of LGNC-07 on memory and attention. Further analyses were stratified by baseline severity to evaluate treatment response on the degree of impairment (MMSE-K 21–23 and 24–26). LGNC-07 led to improvements in memory by marginally increasing delayed recognition in the Rey–Kim memory test (P = .0572). Stratified analyses showed that LGNC-07 improved memory and selective attention by significantly increasing the Rey–Kim memory quotient and word reading in the subjects with MMSE-K scores of 21–23 (LGNC-07, n = 11; placebo, n = 9). Electroencephalograms were recorded in 24 randomly selected subjects hourly for 3 hours in eye-open, eye-closed, and reading states after a single dose of LGNC-07 (LGNC-07, n = 12; placebo, n = 12). Brain theta waves, an indicator of cognitive alertness, were increased significantly in the temporal, frontal, parietal, and occipital areas after 3 hours in the eye-open and reading states. Therefore, this study suggests that LGNC-07 has potential as an intervention for cognitive improvement.

**Source**

**Prion protein-mediated neurotoxicity of amyloid-β oligomers requires lipid rafts and the transmembrane LRP1**

**ABSTRACT**
Soluble oligomers of the amyloid-β (Aβ) peptide cause neurotoxicity, synaptic dysfunction, and memory impairments that underlie Alzheimer disease (AD). The cellular prion protein (PrPC) was recently identified as a high affinity neuronal receptor for Aβ oligomers. We report that fibrillar Aβ oligomers recognized by the OC antibody, which have been shown to correlate with the onset and severity of AD, bind preferentially to cells and neurons expressing PrPC. The binding of Aβ oligomers to cell surface PrPC, as well as their downstream activation of Fyn kinase, was dependent on the integrity of cholesterol-rich lipid rafts. In SH-SY5Y cells, fluorescence microscopy and co-localization with subcellular markers revealed that the Aβ oligomers co-internalized with PrPC, accumulated in endosomes, and subsequently trafficked to lysosomes. The cell surface binding, internalization, and downstream toxicity of Aβ oligomers was dependent on the transmembrane low density lipoprotein receptor-related protein-1 (LRP1). The binding of Aβ oligomers to cell surface...
PrPC impaired its ability to inhibit the activity of the β-secretase BACE1, which cleaves the amyloid precursor protein to produce Aβ. The green tea polyphenol (−)-epigallocatechin gallate and the red wine extract resveratrol both remodeled the fibrillar conformation of Aβ oligomers. The resulting nonfibrillar oligomers displayed significantly reduced binding to PrP-C in a conformation-dependent manner and require the integrity of lipid rafts and the transmembrane LRP1 for their cytotoxicity, thus revealing potential targets to alleviate the neurotoxic properties of Aβ oligomers in AD.


Heart Health

ABSTRACT

Total antioxidant capacity of diet and risk of stroke: a population-based prospective cohort of women

Results:
During follow-up (September 1997 to December 2009), we identified 1322 stroke cases (988 cerebral infarctions, 226 hemorrhagic strokes, and 108 unspecified strokes) among CVD-free women and 1007 stroke cases (796 cerebral infarctions, 100 hemorrhagic strokes, and 111 unspecified strokes) among women with a CVD history. The multivariable hazard ratio of total stroke comparing the highest with the lowest quintile of dietary TAC was 0.83 (95% CI, 0.70-0.99; P for trend=0.04) in CVD-free women. Among women with a CVD history, the hazard ratios for the highest versus lowest quartile of TAC were 0.90 (95% CI, 0.75-1.07; P for trend=0.30) for total stroke and 0.55 (95% CI, 0.32-0.95; P for trend=0.03) for hemorrhagic stroke.

Conclusions:
These findings suggest that dietary TAC is inversely associated with total stroke among CVD-free women and hemorrhagic stroke among women with CVD history.


Skin Health

ABSTRACT

Botanicals in Dermatology: An Evidence based Review

ABSTRACT
Botanical extracts and single compounds are increasingly used in cosmetics but also in over-the-counter drugs and food supplements. The focus of the present review is on controlled clinical trials with botanicals in the treatment of acne, inflammatory skin diseases, skin infections, UV-induced skin damage, skin cancer, alopecia, vitiligo, and wounds. Studies with botanical cosmetics and drugs are discussed, as well as studies with botanical food supplements.

Experimental research on botanicals was considered to a limited extent when it seemed promising for clinical use in the near future. In acne therapy, Mahonia, tea tree oil, and Saccharomyces may have the potential to become standard treatments. Mahonia, Hypericum, Glycyrrhiza and some traditional Chinese medicines appear promising for atopic dermatitis. Some plant-derived substances like dithranol and methoxsalen (8-methoxypsoralen) [in combination with UVA] are already accepted as standard treatments in psoriasis; Mahonia and Capsicum (capsaicin) are the next candidates suggested by present evidence. Oral administration and topical application of antioxidant plant extracts (green and black tea, carotenoids, coffee, and many flavonoids from fruits and vegetables) can protect skin from UV-induced erythema, early aging, and irradiation-induced cancer. Hair loss and vitiligo are also traditional fields of application for botanicals. According to the number and quality of clinical trials with botanicals, the best evidence exists for the treatment of inflammatory skin diseases, i.e. atopic dermatitis and psoriasis. However, many more controlled clinical studies are needed to determine the efficacy and risks of plant-derived products in dermatology. Safety aspects, especially related to sensitization and photodermatitis, have to be taken into account. Therefore, clinicians should not only be informed of the beneficial effects but also the specific adverse effects of botanicals used for dermatologic disorders and cosmetic purposes.


Oral green tea catechin metabolites are incorporated into human skin and protect against UV radiation-induced cutaneous inflammation in association with reduced production of pro-inflammatory eicosanoid 12-hydroxyeicosatetraenoic acid

ABSTRACT

Green tea catechins (GTC) reduce UV radiation (UVR)-induced inflammation in experimental models, but human studies are scarce and their cutaneous bioavailability and mechanism of photoprotection are unknown. We aimed to examine oral GTC cutaneous uptake, ability to protect human skin against erythema induced by a UVR dose range and...
Impact on potent cyclo-oxygenase- and lipoxygenase-produced mediators of UVR inflammation, PGE2 and 12-hydroxyeicosatetraenoic acid (12-HETE), respectively. In an open oral intervention study, sixteen healthy human subjects (phototype I/II) were given low-dose GTC (540 mg) with vitamin C (50 mg) daily for 12 weeks. Pre- and post-supplementation, the buttock skin was exposed to UVR and the resultant erythema quantified. Skin blister fluid and biopsies were taken from the unexposed and the UVR-exposed skin 24 h after a pro-inflammatory UVR challenge (three minimal erythema doses). Urine, skin tissue and fluid were analysed for catechin content and skin fluid for PGE2 and 12-HETE by liquid chromatography coupled to tandem MS. A total of fourteen completing subjects were supplement compliant (twelve female, median 42.5 years, range 29-59 years). Benzoic acid levels were increased in skin fluid post-supplementation (P= 0.03), and methylated gallic acid and several intact catechins and hydroxyphenyl-valerolactones were detected in the skin tissue and fluid. AUC analysis for UVR erythema revealed reduced response post-GTC (P= 0.037). Pre-supplementation, PGE2 and 12-HETE were UVR induced (P= 0.003, 0.0001). After GTC, UVR-induced 12-HETE reduced from mean 64 (sd 42) to 41 (sd 32) pg/μl (P= 0.01), while PGE2 was unaltered. Thus, GTC intake results in the incorporation of catechin metabolites into human skin associated with abrogated UVR-induced 12-HETE; this may contribute to protection against sunburn inflammation and potentially longer-term UVR-mediated damage.

Source
Rhodes LE et al. Oral green tea catechin metabolites are incorporated into human skin and protect against UV radiation-induced cutaneous inflammation in association with reduced production of pro-inflammatory eicosanoid 12-hydroxyeicosatetraenoic acid. Br Weight Management

Laboratory, epidemiological, and human intervention studies show that tea (Camellia sinensis) may be useful in the prevention of obesity

ABSTRACT
Tea (Camellia sinensis, Theaceae) and tea polyphenols have been studied for the prevention of chronic diseases, including obesity. Obesity currently affects >20% of adults in the United States and is a risk factor for chronic diseases such as type II diabetes, cardiovascular disease, and cancer. Given this increasing public health concern, the use of dietary agents for the prevention of obesity would be of tremendous benefit. Whereas many laboratory studies have demonstrated the potential efficacy of green or black tea for the prevention of obesity, the underlying mechanisms remain unclear. The results of human intervention studies are mixed and the role of caffeine has not been clearly established. Finally, there is emerging evidence that high doses of tea polyphenols may have adverse side effects. Given that the results of scientific studies on dietary components, including tea polyphenols, are often translated into dietary supplements, understanding the potential toxicities of the tea polyphenols is critical to understanding their potential usefulness in preventing obesity. In this review, we will critically evaluate the evidence for the prevention of obesity by tea, discuss the relevance of proposed mechanisms in light of tea polyphenol bioavailability, and review the reports concerning the toxic effects of high doses of tea polyphenols and the implication that this has for the potential use of tea for the prevention of obesity. We hope that this review will expose areas for further study and encourage research on this important public health issue.

Source
Grove KA and Lambert JD. Critical Review. Laboratory, epidemiological, and human intervention studies show that tea (Camellia sinensis) may be useful in the prevention of obesity. J of Nutr 140:446-53, 2010.