PHYTOCHEMICALS

NPARR 3(3), 2012-0294, Anti-atherogenic and anti-angiogenic activities of polyphenols from propolis

Propolis is a polyphenol-rich resinous substance extensively used to improve health and prevent diseases. The effects of polyphenols from different sources of propolis on atherosclerotic lesions and inflammatory and angiogenic factors were investigated in LDL receptor gene (LDLr−/−) knockout mice. The animals received a cholesterol-enriched diet to induce the initial atherosclerotic lesions (IALs) or advanced atherosclerotic lesions (AALs). The IAL or AAL animals were divided into three groups, each receiving polyphenols from either the green, red or brown propolis (250 mg/kg per day) by gavage. After 4 weeks of polyphenol treatment, the animals were sacrificed and their blood was collected for lipid profile analysis. The atheromatous lesions at the aortic root were also analyzed for gene expression of inflammatory and angiogenic factors by quantitative real-time polymerase chain reaction and immunohistochemistry. All three polyphenol extracts improved the lipid profile and decreased the atherosclerotic lesion area in IAL animals. However, only polyphenols from the red propolis induced favorable changes in the lipid profiles and reduced the lesion areas in AAL mice. In IAL groups, VCAM, MCP-1, FGF, PDGF, VEGF, PECAM and MMP-9 gene expression was down-regulated, while the metalloproteinase inhibitor TIMP-1 gene was up-regulated by all polyphenol extracts. In contrast, for advanced lesions, only polyphenols from the red propolis induced favorable changes in the lipid profiles and reduced the lesion areas in AAL mice. In IAL groups, VCAM, MCP-1, FGF, PDGF, VEGF, PECAM and MMP-9 gene expression was down-regulated, while the metalloproteinase inhibitor TIMP-1 gene was up-regulated by all polyphenol extracts. In contrast, for advanced lesions, only polyphenols from the red propolis induced the down-regulation of CD36 and the up-regulation of HO-1 and TIMP-1 when compared to polyphenols from the other two types of propolis. In conclusion, polyphenols from propolis, particularly red propolis, are able to reduce atherosclerotic lesions through mechanisms including the modulation of inflammatory and angiogenic factors. [Julio Beltrame Daleprane, Vanessa da Silva Freitas, Alejandro Pacheco, Martina Rudnicki, uiane Aparecida Faine, Felipe Augusto Dörr, Masaharu Ikegaki, Luis Antonio Salazar, Thomas Prates Ong and Dulcinéia Saes Parra Abdalla* (Department of Clinical and Toxicology Analysis, Faculty of Pharmaceutical Sciences, University of Sao Paulo, Sao Paulo, Brazil), The Journal of Nutritional Biochemistry, 2012, 23(6), 557–566].

NPARR 3(3), 2012-0295, Capsaicin represses transcriptional activity of β-catenin in human colorectal cancer cells

Capsaicin is a pungent ingredient in chili red peppers and has been linked to suppression of growth in various cancer cells. However, the underlying mechanism(s) by which capsaicin induces growth arrest and apoptosis of cancer cells is not completely understood. In the present study, we investigated whether capsaicin alters β-catenin-dependent signaling in human colorectal cancer cells in vitro. Exposure of SW480, LoVo and HCT-116 cells to capsaicin suppressed cell proliferation. Transient transfection with a β-catenin/T-cell factor (TCF)-responsive reporter indicated that capsaicin suppressed the transcriptional activity of β-catenin/TCF. Capsaicin treatment resulted in a decrease of intracellular β-catenin levels and a reduction of transcripts from the β-catenin gene (CTNNB1). These results were confirmed by a reduced luciferase reporter activity driven by promoter–reporter construct containing the promoter region of the Catnb gene. In addition, capsaicin destabilized β-catenin through enhancement of proteosomal-dependent degradation. Western blot and immunoprecipitation studies indicated that capsaicin treatment suppressed TCF-4 expression and disrupted the interaction of TCF-4 and β-catenin. This study identifies a role for the β-catenin/TCF-dependent pathway that potentially contributes to the anticancer activity of capsaicin in human colorectal cancer cells. [Seong-Ho
Curcumin selectively inhibits cancer cells growth in vitro and in preclinical model of glioblastoma

Previous studies suggested that curcumin is a potential agent against glioblastomas (GBMs). However, the in vivo efficacy of curcumin in gliomas remains not established. In this work, we examined the mechanisms underlying apoptosis, selectivity, efficacy and safety of curcumin from in vitro (U138MG, U87, U373 and C6 cell lines) and in vivo (C6 implants) models of GBM. In vitro, curcumin markedly inhibited proliferation and migration and induced cell death in liquid and soft agar models of GBM growth. Curcumin effects occurred irrespective of the p53 and PTEN mutational status of the cells. Interestingly, curcumin did not affect viability of primary astrocytes, suggesting that curcumin selectivity targeted transformed cells. In U138MG and C6 cells, curcumin decreased the constitutive activation of PI3K/Akt and NFκB survival pathways, down-regulated the antiapoptotic NFκB-regulated protein bcl-xl and induced mitochondrial dysfunction as a prelude to apoptosis. Cells developed an early G2/M cell cycle arrest followed by sub-G1 apoptosis and apoptotic bodies formation. Caspase-3 activation occurred in the p53-normal cell type C6, but not in the p53-mutant U138MG. Besides its apoptotic effect, curcumin also synergized with the chemotherapeutics cisplatin and doxorubicin to enhance GBM cells death. In C6-implanted rats, intraperitoneal curcumin (50 mg kg

Spent ginger obtained after extraction of oleoresin constitutes more than 90% of the raw material and rich in carbohydrates that could be used as a substrate for the production of bioethanol. Proximate analysis and carbohydrate profiling showed it to contain 60-75% carbohydrates of which starch was the major constituent. This study was undertaken to optimize acid and enzyme hydrolysis for maximum release of fermentable sugars and subsequent fermentation to bioethanol. Enzymatic hydrolysis of the spent samples using Starga® 002 (pH 4.5, 50°C, 20U, 20% substrate load, 48 h) was found to be better than acid hydrolysis as seen from the hydrolytic efficiency and growth of Saccharomyces cerevisiae NCIM 3095 therein. Hydrolytic efficiency of 89.89 and 91.35% were obtained under optimized conditions for the two samples chosen in the study. Fermentation of enzyme hydrolyzed medium showed a maximum fermentation efficiency of 81.53%, and resulted in maximum ethanol production of 43.4g/l [Essaki M. Konar, Shirish M. Harde, Lalit D. Kagliwal and Rekha S. Singhal*(Food Engineering and Technology
Bioactive iridoid glycoside isolated from *Morinda tinctoria* (Roxb.) roots exhibit therapeutic efficacy

Novel natural compounds endowed with sound bioactivities are currently the utmost need as leads toward drug discovery. We have isolated a novel iridoid glycoside, tinctoroid, from the roots of a prominent dye-yielding plant, *Morinda tinctoria* (Linn.) Roxb. Structural characterization was carried out employing nuclear magnetic resonance (NMR), mass spectrometry (MS), Fourier transform infrared (FTIR) and ultraviolet–visible spectroscopy (UV–vis). The compound was further evaluated for its therapeutic applicability. Antioxidant potential was assessed by DPPH radical scavenging assay and reducing power analysis. Moreover, the glycoside was investigated to elucidate its potential for non-specific and site-specific deoxyribose degradation. Proficiency in inhibiting lipid peroxidation was adjudged using thiobarbituric (TBA) assay on mice liver homogenate. Tinctoroid was found to exhibit efficacy in protecting DNA from oxidative injury inflicted by H$_2$O$_2$. The compound demonstrated moderate cytotoxicity in liver carcinoma (Hep3B) cells. In addition, it was found to be non-toxic in Swiss Albino mice. The compound isolated from genus *Morinda*, one of the pioneer hubs of therapeutic natural products, makes tinctoroid a viable option. Furthermore, efficacy of the compound in the aforesaid assays, asserts its bioactivity and subsequently its importance as a potent therapeutic. [Dipita Bhakta, Akella Sivaramakrishna and Ramamoorthy Siva* (Division of Plant Biotechnology, School of Bio Sciences and Technology, VIT University, Vellore 632 014, Tamil Nadu, India) *Industrial Crops and Products*, 2013, 42, 349-356]