

The carcinogenic and non-carcinogenic risk assessment of heavy metals from the butts of smoked and non-smoked cigarettes

Cigarettes are known as the most popular tobacco in the world. The aim of this study was to evaluate the concentrations of heavy metals in smoked and non-smoked cigarette butts (CBs) from ten cigarette brands (including five Iranian brands) and human health risk assessment associated with inhalation exposure. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) was used for heavy metals measurement after CBs digestion. The results showed that the highest concentrations of heavy metals in non-smoked and smoked cigarette butts are related to Pb (0.63 ± 0.21 mg/g) and Ni (0.81 ± 1.48 mg/g), respectively. The concentration of all heavy metals in smoked CBs is significantly higher than in non-smoked. According to the results, Ni and Cd elements in 60% of Iranian brands and 80% of other brands have HI > 1, which indicates a potential non-carcinogenic risk for consumers. Also, the carcinogenic risk of Cr in all brands is higher than $1.00E-4$, which indicates the carcinogenic risk of the consumer in case of continuous exposure to cigarette smoke. Heavy metals in CBs can have potential carcinogenic and non-carcinogenic effects on the health of smokers exposed to inhalation. Therefore, continuous monitoring and regulation of the ingredients of domestically produced and imported cigarettes are recommended.

ZnFe₂O₄@L-cysteine-N/RGO as efficient nano-sonosensitizers, pH-responsive drug carriers and surface charge switchable drug delivery system for targeted chemo-sonodynamic therapy of cancer.

Chemo-sonodynamic therapy (CSDT) utilizes Ultrasound (US) responsive and pH generation of reactive oxygen species (ROS) (O₂, OH, H₂O₂) from magnetic ZnFe₂O₄ nano-sonosensitizers (NSSs). It can be considered as an effective procedure to treat some cancer along with chemotherapy. In this work we designed CSDT exhibiting pH/US-responsive drug release through acidic pH (5.5) and ROS generation from Curcumin (Cur)-loaded ZnFe₂O₄@L-cysteine-nitrogen-doped reduced graphene oxide (N/RGO) nano-carriers. Finally, the generation of free radicals and their combination with chemotherapy increases the effectiveness of cancer treatment. In this study, a straightforward method by which could be functionalized surface of ZnFe₂O₄ NSSs via L-cysteine or cysteine (L-Cys or Cys) for anti-cancer Cur delivery was developed. Cur was linked to the surface of as-fabricated ZnFe₂O₄@L-Cys through covalent bond. Apart from being a standard thiol stabilizer, L-Cys is eco-friendly, good water-soluble, and biocompatible making it a very effective capping ligand for ZnFe₂O₄ NSSs. The present study deals with obtaining a targeted drug delivery system making use of CSDT. To raise the drug encapsulation efficiency and specificity of drug uptake by cancer cells, ZnFe₂O₄ NSSs functionalized and loaded with L-Cys and N/RGO. The ZnFe₂O₄@L-Cys NPs size on the N/RGO nanosheets surface was about 50 nm. The DLE value was reached 63.17 % and 71.65 % for ZnFe₂O₄@L-Cys and ZnFe₂O₄@L-Cys-N/RGO, respectively at 24 h. The amount of Cur release in ZnFe₂O₄@L-Cys-N/RGO nanocarrier under US irradiation and pH 5.5 condition was higher than pH 7.4 environment and without US irradiation.

Quality of Life of Residents in Hospitals Affiliated to Kashan University of Medical Sciences during the COVID-19 Pandemic

The prevalence of COVID-19 significantly affected different aspects of the quality of life (QoL) in people, especially the medical staff, who are at the forefront of battle against the disease. This study aims to investigate the QoL of medical residents of hospitals affiliated to Kashan University of Medical Sciences (KUMS) during the COVID-19 pandemic. This cross-sectional study was conducted on 140 medical residents of hospitals affiliated to KUMS in 2021. Their QoL was assessed using World Health Organization quality of life (WHOQOL). The collected data were analyzed in SPSS software, version 22 using Chi-square, Mann-Whitney U test, t-test, one-way analysis of variance, Kolmogorov-Smirnov test, Pearson and Spearman correlation tests. The physical health dimension had a statistically significant relationship with age, marital status, underlying disease, sports/arts activities, and year of residency ($P < 0.001$). The psychological health dimension had a statistically significant relationship with marital status, underlying disease, sports/ arts activities, and year of residency ($P < 0.001$). The social relationships dimension had a statistically significant relationship with marital status, underlying disease, and year of residency. The environmental health dimension had a statistically significant relationship with sex, marital status, underlying disease and year of residence ($P < 0.05$). Female residents had lower QoL. The residents in pathology, neurology and infectious diseases had higher QoL, while those in psychiatry had higher scores in the psychological health dimension.

Schizophrenia, Curcumin and Minimizing Side Effects of Antipsychotic

Drugs: Possible Mechanisms

Schizophrenia is a mental disorder characterized by episodes of psychosis; major symptoms include hallucinations, delusions, and disorganized thinking. More recent theories focus on particular disorders of interneurons, dysfunctions in the immunessystem, abnormalities in the formation of myelin, and augmented oxidative stress that lead to alterations in brain structure. Decreased dopaminergic activity and increased phospholipid metabolism in the prefrontal cortex might be involved in schizophrenia. Antipsychotic drugs used to treat schizophrenia have many side effects. Alternative therapy such as curcumin (CUR) can reduce the severity of symptoms without significant side effects. CUR has important therapeutic properties such as antioxidant, anti-mutagenic, anti-inflammatory, and antimicrobial functions and protection of the nervous system. Also, the ability of CUR to pass the blood-brain barrier raises new hopes for neuroprotection. CUR can improve and prevent further probable neurological and behavioral disorders in patients with schizophrenia. It decreases the side effects of neuroleptics and retains lipid homeostasis. CUR increases the level of brain-derived neurotrophic factor and improves hyperkinetic movement disorders. CUR may act as an added counteraction mechanism to retain cell integrity and defense against free radical injury. Thus it appears to have therapeutic potential for improvement of schizophrenia. In this study, we review several properties of CUR and its ability to improve schizophrenia and minimize the side effects of antipsychotic drugs, and we explore the underlying mechanisms by which CUR affects schizophrenia and its symptoms.

The effect of vitamin D on morphine preference in rats: Possible biochemical and DRD2–GDNF signaling.

Despite half a century of research on vitamin D (Vit. D), its link to substance abuse and dependence has only been discussed in recent decades. Evidence also shows the involvement of Vit. D in the evolution of dopaminergic neurons in the nucleus accumbens, an increase in the expression of tyrosine hydroxylase, and the regulation of dopaminergic processes. The novel idea for this work is taken from a hypothesis given about the effectiveness of Vit. D on dopamine signaling pathway. It is therefore presumed that Vit. D can be considered an effective therapeutic approach for narcotic addiction and substance abuse.. The animals were assigned into six groups (control, vehicle, Morphine [Mor.], and Vit. D [250, 500, and 1000 IU/kg, i.p.]). Following each conditioning session in a conditioned place preference (CPP) model, the animals received Vit. D. Afterward, the locomotor activity of the animals was assessed using open-field apparatus. Malondialdehyde (MDA), nitric oxide (NO), catalase (CAT), superoxide dismutase (SOD), thiol, and total antioxidant capacity (TAC) were measured in the brain. The relative DRD2 and GDNF expressions (%) were also measured in the hippocampus. Vit. D administration after Mor. caused a significant increase in the place preference index in the acquisition phase ($p < .05$). Vit. D altered the oxidation/antioxidation profiles (CAT, SOD, MDA, NO, TAC, and Thiol). Vit. D was more effective than Mor. in the expression of GDNF ($p < .0001$); however, in the expression of DRD2, this was only the case for 1000 IU Vit. D ($p < .0001$). Considering the increased place preference index induced by Mor., it can be concluded that Vit. D interacts via the oxidative pathway and DRD2–GDNF signaling to potentiate the Mor Effect.