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Knockdown Of TDAG8 Reduces Inflammatory Pain

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Backgrounds:

Chronic inflammatory pain results from the direct activation of nociceptors in the skin or soft tissues in response to tissue injury. The damaged and immune cells release inflammatory mediators such as proteases, ATP, proton to cause direct excitation or modulation of nociceptors. High local proton concentrations (tissue acidosis) is mainly responsible for inflammatory pain. Tissue acidosis results in direct excitation or modulation of nociceptive sensory neurons by activating proton-sensing receptors. These receptors are divided into proton-sensing ion channels and proton-sensing G-protein-coupled receptors (GPCRs). It was previously found that all four proton-sensing GPCRs, including OGR1, GPR4, G2A, and TDAG8, are expressed in pain-relevant loci, the dorsal root ganglia (DRG) and TDAG8 has increased expression in inflamed DRG. However, it remains unclear whether TDAG8 is directly involved in inflammatory pain.

Materials and Methods:

In this study, I used shRNA-mTDAG8-B1 to knockdown TDAG8 in vivo and in vitro to investigate the roles of TDAG8 in inflammatory pain.

Results:

The results show that knockdown of TDAG8 decreased TDAG8 protein expression and reduced intracellular cAMP levels and intracellular calcium increase. Decrease of TDAG8 expression completely inhibited acid-induced pain but partially inhibited inflammatory pain.

Conclusion:

TDAG8 is involved in acid-induced pain and inflammatory pain.

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Proteomic analysis of the protein profiles in the late stage of repair processes of SCI rat

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Acidic fibroblast growth factor (aFGF), acts as a potent neurotrophic factor, could stimulate the survival of neurons and re-growth of neurite in the injured spinal cord area. However, the molecular mechanism of protective effect of aFGF in vivo is still not clearly or fully understood. Previous studies showed that significant improvement in the locomotor behavior analysis resulted from of the aFGF-treated rats after contusive spinal cord injury (SCI).

SCI will initiate the different pathological changes along with time, it is therefore, we would like to propose that aFGF may play different role at different time course during the repair processes. Proteomic and bioinformatic approach were adapted to investigate the protein profile changes of the damaged spinal cord tissue of the SCI rats treated either with or without aFGF at 28 days after contusive injury. Result of proteomic analysis indicated that all these differentially expressed proteins were categorized into the function of oxidative stress, anti-apoptosis effect, neuronal transporters, and glucose metabolism, etc. Hence, the protective effect of aFGF at the time course came from a set of teamwork of multiple factors that may attenuate secondary injury for providing a better condition recovering from the damage.

In this study, our results provide a better insight into the SCI regeneration mechanisms in the late stage of repair processes of SCI rat. We hope that our experimental results could provide insight into the molecules basis of the repair process of SCI that may be useful for clinical application for the SCI patient.

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Screening of Anti-bacteria Herbs Deriving from Taiwanese Folk Medicinal Plants

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Backgrounds:

To find out new antibiotics from local plants' extractions those can against *Escherichia coli (E. coli), Klebsiella pneumonia (K. pneumonia) and Propionibacterium acnes (P. acnes).*

Materials and Methods:

We prepared crude extracts from seven types of plants used in traditional Chinese herbalism in *Southern Taiwanese, Vitis Amurensis, Artemisia argyi, Kyllinga brevifolia rottb, Hydrocotyle nepalensis Hook, Blumea laciniata (Roxb.) DC., Hibiscus rosa-sinensis Linn and Abutilon indicum (L.) Sweet.* The extracts were obtained by using the cold soaking process with acetone(Ace), ethyl acetate(EA), ethanol(EtOH) and hexane(Hex), respectively. The extracts were used to investigate their antibacterial activity by paper disc diffusion assay on E. *coli* ATCC 25922, *K. pneumonia* ATCC 700603, *P. acnes* ATCC 11827 and *P. acnes* ATCC 6919.

Results:

At the end of herbal extraction, 54 extracts were obtained. The results of the antibacterial tests showed that the Ace-, EA-, EtOH- and Hex- extracts of Artemisia *argyi, Kyllinga brevifolia rottb, Hydrocotyle nepalensis Hook and Blumea laciniata (Roxb.) DC.* were effective for *P. acnes* ATCC 6919, and the diameter of growth inhibition was 8.5-15 mm. Simultaneously, the Ace-, EA-, EtOH- and Hex- extracts of *Artemisia argyi, Kyllinga brevifolia rottb* and *Hibiscus rosa-sinensis Linn* were effective for *P. acnes* ATCC 11827, and the diameter of growth inhibition was 8.5-12 mm. The best antibacterial activity was the EtOH- and Ace-extracts of *Vitis* amurensis for P. acnes ATCC 11827, the diameter of inhibition zone were 18 and 16 mm, respectively.

Conclusion:

Our results indicated there was no herbal extracts have an anti-bacterial effect against E. coli ATCC 25922 and K. pneumonia ATCC 700603. But, 18 and 16 of 54 extracts were effective for antibacterial activity against P. acnes ATCC 11827 and 6919, respectively.

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Nanogold-based carriers for the drug delivery of butylidenephthalide into human brain glioblastoma cells

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Backgrounds:

The use of chemical synthesis, such as chloroauric acid (HAuCl4) as the carrier to deliver the gene or drug into cells have been widely used in previous report. However, there are some disadvantages, such as chemical reagent residues in the synthesis process and caused biological toxicity effect. Recently we have developed a novel nanogold-based carrier by physical synthesis method, while fabricated by building poly(ethyl glycol)(PEG) and conjugated with flourescein isothiocyanat (FITC) for carrying butylidenephthalide (BP) into human brain glioblastoma cells (DBTRG) to assess the effectiveness of drug delivery capacity.

Materials and Methods:

In this study, gold nanoparticles (AuNPs) were capped by poly(ethyl glycol) (PEG) and conjugated with butylidenephthalide (BP) via the reaction of 3(3,(dimethylamino)propy)carbodiimide hydrochloride (EDC). Conjugation of the BP onto AuNPs was confirmed by the UV-Vis spectroscope, Fourier Transform Infrared spectrometer (FTIR) and Scanning Electron Microscope (SEM) and Dynamic Light Scattering (DLS) analysis. Cellular biological function was examined by using MMT, immunofluoresence staining (IF) and uptake test.

Results:

A schematic illustration of AuNPs (≈ 5 nm diameter), coated with PEG to improve stability and conjugated with FITC for fluorescence. The size was increased to ~ 86 nm based on DLS analysis. We then transfected DBTRG cells with the AuNPs-BP in vitro. AuNPs-BP had significant cellular toxicity effect in DBTRG cells while compared to AuNPs alone treatment group. The exposure (transfection) time of 2~3 h was required for achieving a better uptake of AuNPs-BP by the DBTRG cells.

Conclusion:

DBTRG transfected with AuNPs-BP may provide more efficacious cell-based therapy for brain tumor yet a better understanding of the mechanisms regulating the cellular uptake and intracellular trafficking of AuNPs-BP is required.