Université A/Mira- Bejaia
Faculté des sciences de la nature et de la vie
Département de biologie physico-chimique
Master 1 Biochimie Appliquée

Analyse d'Articles Anglais Scientifique II
Tutorial 01

Read the abstracts bellow and answer the following questions

1. To each abstract, select 05 keywords
2. Write a title for each abstract
3. For each summary design a graphical abstract

Abstract 01

Immune-autonomic interactions are known to occur at the level of the adrenal medulla, and to be important in immune and stress responses, but the molecular signaling pathways through which cytokines actually affect adrenal chromaffin cell function are unknown. Here, we studied the effects of the proinflammatory cytokines, TNF-alpha and IL-1, on gene transcription and secretion of bioactive neuropeptides, in primary bovine adrenochromaffin cells. TNF-alpha and IL-1 induced a time- and dose-dependent increase in galanin, vasoactive intestinal polypeptide, and secretogranin II mRNA levels. The two cytokines also stimulated the basal as well as depolarization-provoked release of enkephalin and secretoneurin from chromaffin cells. Stimulatory effects of TNF-alpha on neuropeptide gene expression and release appeared to be mediated through the type 2 TNF-alpha receptor, and required activation of ERK 1/2 and p38, but not Janus kinase, MAPKs. In addition, TNF-alpha increased the binding activity of activator protein-1 (AP-1) and stimulated transcription of a reporter gene containing AP-1-responsive elements in chromaffin cells. The AP-1-responsive reporter gene could also be activated through the ERK pathway. These results suggest that neuropeptide biosynthesis in chromaffin cells is regulated by TNF-alpha via an ERK-dependent activation of AP-1-responsive gene elements. Either locally produced or systemic cytokines might regulate biosynthesis and release of neuropeptides in chromaffin cells, integrating the adrenal medulla in the physiological response to inflammation. This study describes, for the first time, a signal transduction pathway activated by TNF-alpha in a major class of neuroendocrine cells that, unlike TNF-alpha signaling in lymphoid cells, employs ERK and p38 rather than Janus kinase and p38 to transmit gene-regulatory signals to the cell nucleus.

Abstract 02

Alzheimer's disease (AD) is associated with an altered immune response, resulting in chronic increased inflammatory cytokine production with a prominent role of TNF-α. TNF-α signals are mediated by two receptors: TNF receptor 1 (TNFR1) and TNF receptor 2 (TNFR2). Signaling through TNFR2 is associated with neuroprotection, whereas signaling through TNFR1 is generally proinflammatory and proapoptotic. Here, we have identified a TNF-α-induced proinflammatory agent, lipocalin 2 (Lcn2) via gene array in murine primary cortical neurons. Further investigation showed that Lcn2 protein production and secretion were activated solely upon TNFR1 stimulation when primary murine neurons, astrocytes, and microglia were treated with TNFR1 and TNFR2 agonistic antibodies. Lcn2 was found to be significantly decreased in CSF of human patients with mild cognitive impairment and AD and increased in brain regions associated with AD pathology in human postmortem brain tissue. Mechanistic studies in cultures of primary cortical neurons showed that Lcn2 sensitizes nerve cells to β-amyloid toxicity. Moreover, Lcn2 silences a TNFR2-mediated protective neuronal signaling cascade in neurons, pivotal for TNF-α-mediated neuroprotection. The present study introduces Lcn2 as a molecular actor in neuroinflammation in early clinical stages of AD.

Abstract 03

Diagnostic testing is important for managing the 2019 novel coronavirus (SARS-CoV-2). We developed an optimized protocol for SARS-CoV-2 RNA extraction from the surface of the respiratory mucosa with nasopharyngeal swabs and compared the sensitivity of RNA extraction methods. RNA extraction was performed using three different procedures (TRIzol, QIAamp, VMT-TRIzol) from nine positive SARS-CoV-2 samples. SARS-CoV-2 was detected by real-time reverse transcriptase PCR (RT-PCR) using a detection kit for SARS-CoV-2 (Sun Yat-sen University). Compared to RT-PCR results, there were no discernible differences in detection rates when comparing the three different extraction procedures. On the basis of these results, the use of TRIzol as a transport medium and RNA extraction method for SARS-CoV-2 detection may be a helpful alternative for laboratories facing shortages of commercial testing kits.