Anterior pituitary cells express pattern recognition receptors for fungal glucans: implications for neuroendocrine immune involvement in response to fungal infections


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Abstract

OBJECTIVES:

Hormones and cytokines are known to act as regulatory messengers between the neuroendocrine and immune systems. The innate immune system identifies infectious agents by means of pattern-recognition receptors. These receptors recognize pathogen-specific macromolecules called pathogen-associated molecular patterns. Fungal cell wall glucans nonspecifically stimulate various aspects of innate immunity via interaction with membrane receptors on immune-competent cells. Glucans are also released into the systemic circulation of patients with fungal infections. Recent evidence confirms the existence of glucan-specific receptors on cells outside the immune system. We hypothesized that glucans may directly interact with pituitary cells as an early signaling event in fungal infections.

METHODS:

We characterized the receptor-mediated interaction of glucan derived from Candida albicans with pituitary cells using surface plasmon resonance. Prolactin levels were assayed by commercial ELISA. TLR2, TLR4 and CD14 mRNA levels were assessed by RT-PCR.

RESULTS:

A single glucan-specific binding site was identified on rodent somatomammotroph (K(D) = 3.9 microM) and human folliculostellate cell (K(D) = 3.6 microM) membranes. Coincubation of glucan with somatomammotroph cells for 72 h significantly (p < 0.01) increased prolactin accumulation by 56-62% over that observed in cells treated with media alone. Glucan also increased TLR4 and CD14 gene expression in human folliculostellate cells.
CONCLUSIONS:

Pituitary cells directly recognize and respond to fungal cell wall glucans resulting in stimulation of pituitary cell TLR4 and CD14 gene expression. In addition, glucan stimulates secretion of prolactin, a hormone that plays an important role in the response to infection.

PMID: 14557673

Source: https://www.ncbi.nlm.nih.gov/pubmed/?term=17411351