

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

Breuel KF¹, Kougias P, Rice PJ, Wei D, De Ponti K, Wang J, Laffan JJ, Li C, Kalbfleisch J, Williams DL.

Author information

¹Department of Obstetrics and Gynecology, James H. Quillen College of Medicine, East Tennessee State University, Johnson City, TN 37614, USA. breuel@etsu.edu

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 ($K(D) = 3.9 \text{ microM}$) and human folliculostellate cell ($K(D) = 3.6 \text{ microM}$) 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>