

ANTIFUNGAL IMMUNE RESPONSE

For years researchers believed that any effective antifungal vaccine would have to induce the production of antibodies. Research studies have now shown that the cellular immune responses mediated by Th1 and Th17 cytokines are just as important.

THE INNATE IMMUNE RESPONSE

When a fungal infection breaks through the body's normal defenses **1**, it first activates the innate arm of the immune system, which recognizes the invading fungus by the generic fungal sugars called mannans. Phagocytic cells such as neutrophils, macrophages, and dendritic cells then engulf and digest the fungi they encounter **2**. However, fungi can easily outnumber these cells, requiring a second line of defense.

THE ADAPTIVE IMMUNE RESPONSE

Dendritic cells activate the adaptive response by presenting chopped-up fungal antigens to T-helper cells. These cells secrete cytokines that usually skew the immune response toward either a Type 1 (Th1), or Type 2 (Th2) response, (though both can be activated at once). The Th1 pathway initiates cell-mediated inflammation with the help of cytotoxic T cells as well as more neutrophils and macrophages **3**. Cytokines secreted by Th2-cells activate B cells, which generate antibodies specific to the invading fungus. The B cells turn into plasma cells, which flood the bloodstream with antibodies that cover the fungus, making it an easier target for phagocytic cells **4**.

