Abstract

Ceramide monohexosides (CMHs, cerebrosides) are glycosphingolipids composed of a hydrophobic ceramide linked to one sugar unit. In fungal cells, CMHs are very conserved molecules consisting of a ceramide moiety containing 9-methyl-4,8-sphingadienine in amic linkage to 2-hydroxyoctadecanoic or 2-hydroxyhexadecanoic acids, and a carbohydrate portion consisting of one residue of glucose or galactose. 9-Methyl 4,8-sphingadienine-containing ceramides are usually glycosylated to form fungal cerebrosides, but the recent description of a ceramide dihexoside (CDH) presenting phytosphingosine in Magnaporthe grisea suggests the existence of alternative pathways of ceramide glycosylation in fungal cells. Along with their unique structural characteristics, fungal CMHs have a peculiar subcellular distribution and striking biological properties. In Pseudallescheria boydii, Candida albicans, Cryptococcus neoformans, Aspergillus nidulans, A. fumigatus, and Schizophyllum commune, CMHs are apparently involved in morphological transitions and fungal growth. The elucidation of structural and functional aspects of fungal cerebrosides may therefore contribute to the design of new antifungal agents inhibiting growth and differentiation of pathogenic species.

Keywords

glucosylceramide; cerebrosides; glycosphingolipids; fungal pathogens; antifungal therapy.