A Novel Category of Bioactive Diiminopiperazines

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Technology description

Technical Summary

Sphingolipids are a group of lipids found in all eukaryotic cells, as well as some prokaryotes and viruses. The structural backbone of the sphingolipids are sphingosine and other long-chain (sphingoid) bases and have been found to affect diverse cellular systems including, protein kinase C, Na+, K+-ATPase, phosphatidic acid phosphatase, phospholipases (including phospholipase D), retinoblastoma protein phosphorylation, and sphingosine-activated protein kinases. Free sphingoid bases (sphinganine and spingosine), sphingosine-1-phosphate, and ceramides are formed endogenously as lipid mediators. Sphingolipids have been studied as intracellular lipid messengers for agonists such as tumor necrosis factor, nerve growth factor, platelet-derived growth factor, cytotoxic agents, and are involved in various forms of stress. Sphingolipid metabolites are highly active and control important cell functions, which include inflammation, growth, cell differentiation and development, cell death, and aging. Based on the involvement of sphingolipids in cellular systems, there is a need for methods or compositions that allow for control or modulation of sphingolipid metabolism. These methods and compositions will be useful in controlling the biological processes affected by sphingolipids and for the treatment of diseases that have disorders involving cell regulatory pathways. In addition, other bioactive lipid metabolites (such as diacylglycerols) have been shown to change during a transient sphingosine "burst," suggesting that agents that affect one cell signaling pathway may have important effects on other cell signaling systems and have a broad pharmacologic utility. These compounds also have the ability to modulate cell behavior in applications such as production of biomolecules using cells in culture and other types of bioreactors.

Application area

These methods and compositions will be useful in controlling the biological processes affected by sphingolipids and for the treatment of disease that have disorders involving cell regulatory pathways.

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