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شبكة المعلومات الجامعية

بسم اللّه الرحمن الرحيم

hossam maghraby

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التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بالرسالة صفحات
لم ترد بالأصل

Glycosphingolipids and its related enzyme in schistosomiasis

Thesis

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By

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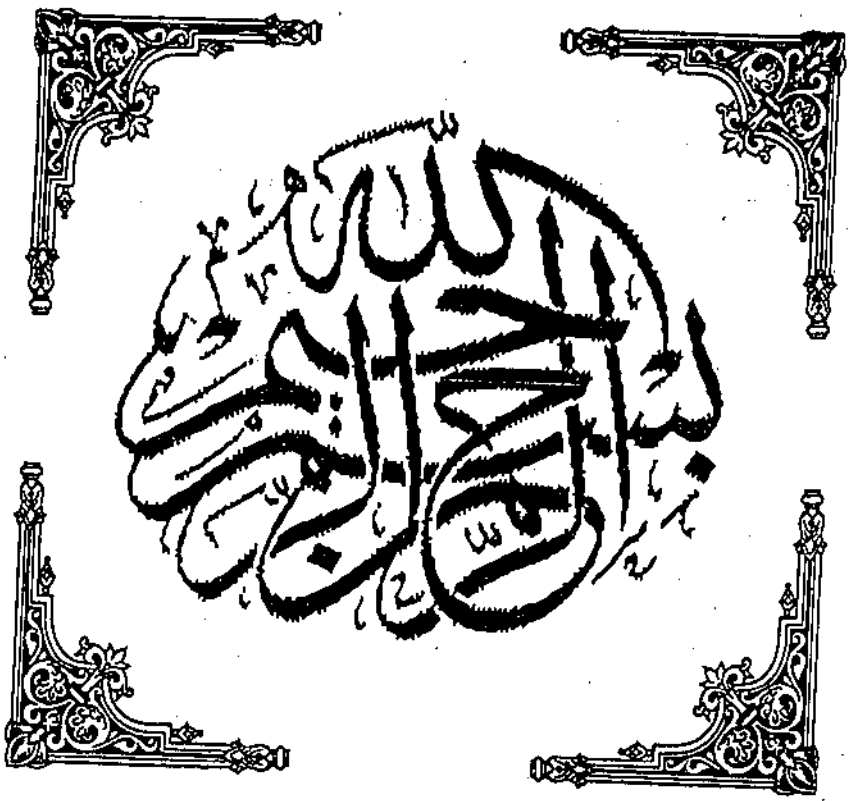
بسم الله الرحمن الرحيم

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Content

CHAPTER I

INTRODUCTION

Introduction

Part 1. Glycolipids

Lipids have been classified in several different ways. The most satisfactory classification is based on their backbone structure. The complex lipids, which contain fatty acids as components, include the acylglycerol, the phosphoglycerides, the sphingolipids, and the waxes. The other greater group consists of the simple lipids which contain no fatty acids [1].

Glycosphingolipids (GSLs), which are one type of sphingolipids, are composed of a long chain base (sphingoid), a fatty acid, and a carbohydrate. The hydrophobic moiety, which is a ceramide, consists of the long chain base substituted at the amino group by a fatty acid. The carbohydrate moiety is linked at the primary hydroxy group of the sphingoid base, e.g., sphingosine (sphing-4-ene) [2].

GSLs usually are classified with respect to the chemical structures found in their carbohydrate moiety. This includes the number and species of the constituent monosaccharides, their sequence, positional and anomeric linkage, and other components such as sulfate ("sulfatides") or sialic acid ("gangliosides") [2-4].

The nomenclature and abbreviations recommended by the IUPAC-IUP Nomenclature Commission (1977) [5] cover semi-systematically the structures of most GSLs.

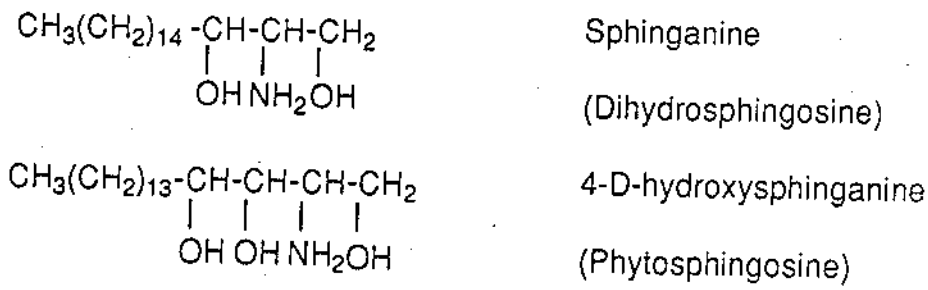

Fig. 1 : structure of dihydrosphingosine and phytosphingosine.

Although sphingosine (sphing-4-ene) is predominate long-chain base in many GSLs, other sphingoids such as dihydrosphingosine or phytosphingosine may be more or less prevalent (fig. 1). Phytosphingosine was found as a principle long-chain base of fungus [6] and plant [7]

GSL are classified ,according to their carbohydrate structure into (table 1):

I) Gala series :

I-1) Galactosylceramide (galactocerebroside) :

This lipid was discovered in human brain by Thudichum (1884) [8,9] it has been also isolated from organisms other than mammals, such as *Aspergillus niger* [10].

I-2) Galabiosylceramide (digalactosylceramide)

This lipid, along with globotriaosylceramide was found to be one of the lipid stored in the kidneys of a patient with Fabry's disease, a genetic α-galactosidase deficiency [11] . The normal human kidney was found to contain this lipid and lactosylceramide [12].

II) Glucosylceramide and lactoceramide :

They are the common biogenic precursors of globo, ganglio, and lacto series GSLs. They were first demonstrated in the spleens of patients with Gaucher disease [13,14]. Later they were isolated from normal human spleen and a trace amount was isolated from bovine, mouse, and human brain. Glucosylceramide has also been found in yeast, fungi, and plant leaves [15].

Table 1 : Structure of neutral and sulfated glycosphingolipids.

Structure	Abbreviation	Systemic Name
I- Gala series		
I-1 Galβ1 → 1Cer	GaCer	Galactosylceramide
I-2 Galα1 → 4Galβ1 → 1Cer	Ga_2Cer	Galabiosylceramide
II- Glucosylceramide and lactosylceramide		
II-1 Glcβ1 → 1Cer	GlcCer	Glucosylceramide
II-2 Galβ1 → 4Glcβ1 → 1Cer	LacCer	Lactosylceramide
III- Globo and isoglobo series		
III-1 Galα1 → 4Galβ1 → 4Glcβ1 → 1Cer	Gb_3Cer	Globotriaosylceramide
III-2 Galα1 → 3Galβ1 → 4Glcβ1 → 1Cer	iGb_3Cer	Isoglobotriaosylceramide
III-3 GalNAcβ1 → 3Galα1 → 4Galβ1 → 4Glcβ1 → 1Cer	Gb_4Cer	Globotetraosylceramide
IV- Ganglio series		
IV-1 GalNAcβ1 → 4Galβ1 → 4Glcβ1 → 1Cer	Gg_3Cer	Gangliotriaosylceramide
IV-2 Galβ1 → 3GalNAcβ1 → 4Galβ1 → 4Glcβ1 → 1Cer	Gg_4Cer	Gangliotetraosylceramide
V- Lacto and neolacto series		
V-1 GlcNAcβ1 → 3Galβ1 → 4Glcβ1 → 1Cer	Lc_3Cer	Lactotriaosylceramide
V-2 Galβ1 → 4GlcNAcβ1 → 3Galβ1 → 4Glcβ1 → 1Cer	nLc_4Cer	Neolactotetraosylceramide
V-3 Galβ1 → 3GlcNAcβ1 → 3Galβ1 → 4Glcβ1 → 1Cer	Lc_4Cer	Lactotetraosylceramide
VI- Sulfated glycosphingolipids		
VI-1 HSO_3 → 3Galβ1 → 1Cer	I^3SO_3-GalCer	Galactosylceramide-I^3-sulfate
VI-2 HSO_3 → 3Galβ1 → 4Glcβ1 → 1Cer	II^3SO_3-LacCer	Lactosylceramide-II^3-sulfate