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REVIEW

N-glycosylation, a leading role in viral infection and immunity development

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Abstract

N-linked protein glycosylation is an essential co-and posttranslational protein modification that occurs in all three domains of life; the assembly of *N*-glycans follows a complex sequence of events spanning the (Endoplasmic Reticulum) ER and the Golgi apparatus. It has a significant impact on both physicochemical properties and biological functions. It plays a significant role in protein folding and quality control, glycoprotein interaction, signal transduction, viral attachment, and immune response to infection. Glycoengineering of protein employed for improving protein properties and plays a vital role in the production of recombinant glycoproteins and struggles to humanize recombinant therapeutic proteins. It considers an alternative platform for biopharmaceuticals production. Many immune proteins and antibodies are glycosylated. Pathogen's glycoproteins play vital roles during the infection cycle and their expression of specific oligosaccharides via the *N*-glycosylation pathway to evade detection by the host immune system. This review focuses on the aspects of *N*-glycosylation processing, glycoengineering approaches, their role in viral attachment, and immune responses to infection.

Keywords Posttranslational modifications · *N*-glycan · Glycoengineering · Viral infection · Immune response

Introduction

Glycosylation of protein is a ubiquitous and essential form of co-translational and posttranslational modifications involved in numerous biological processes. This is an enzymatic process in which sugar moieties are covalently attached to the side chain of an amino acid residue [1, 2]. Depending on the attachment of sugar moieties, they can be categorized as (1) *N*-glycosylation (saccharides linked to the amide nitrogen of asparagine (Asn) side chain); (2) *O*-linked glycosylation (saccharides linked to OH group of serine (Ser) or threonine (Thr), hydroxyproline side chains); (3) Phosphoserine glycans (saccharides linked to the phosphate of a phosphoserine); (4) *C*-linked glycans (a rare form of glycans added to carbon on tryptophan side chain); (5) Glypiated glycans (addition of a glycosyl-phosphatidylinositol (GPI) anchor that links proteins to lipids through glycan linkages); and (6) Other *O*-linked glycans found in cytoplasmic/nucleoplasmic proteins, such as *O*-linked *N*-acetylglucosamine (*O*-GlcNAc), *O*-fucose, and *O*-mannose [3, 4].

In this review, we focus on *N*-glycosylation which is predominant among all classes of glycosylation and occurs in all three domains of life. Based on signaling present on protein, the process of *N*-glycosylation start in the endoplasmic reticulum (ER) and enters to Golgi Apparatus (GA) where specific structural elements such as core fucosylation and branching are introduced [5]. Initially, it was reported that glycosylation is limited to eukaryotes while active processes are also seen in prokaryotes [6]. It was reported that nearly 70% of eukaryotic cells proteins are glycosylated, and 20% of all proteins are lipid-modified [7]. *N*-glycosylation is associated with protein functioning and its folding [8]. Nowadays RNA also serves as a scaffold for glycosylation.

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Review

Friedelin: Structure, Biosynthesis, Extraction, and Its Potential Health Impact

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Abstract: Pharmaceutical companies are investigating more source matrices for natural bioactive chemicals. Friedelin (friedelan-3-one) is a pentacyclic triterpene isolated from various plant species from different families as well as mosses and lichen. The fundamental compounds of these friedelane triterpenoids are abundantly found in cork tissues and leaf materials of diverse plant genera such as Celastraceae, Asteraceae, Fabaceae, and Myrtaceae. They possess many pharmacological effects, including anti-inflammatory, antioxidant, anticancer, and antimicrobial activities. Friedelin also has an anti-insect effect and the ability to alter the soil microbial ecology, making it vital to agriculture. Ultrasound, microwave, supercritical fluid, ionic liquid, and acid hydrolysis extract friedelin with reduced environmental impact. Recently, the high demand for friedelin has led to the development of CRISPR/Cas9 technology and gene overexpression plasmids to produce friedelin using genetically engineered yeast. Friedelin with low cytotoxicity to normal cells can be the best phytochemical for the drug of choice. The review summarizes the structural interpretation, biosynthesis, physicochemical properties, quantification, and various forms of pharmacological significance.

Keywords: friedelin; phytochemicals; extraction methods; anticancer; neuroprotective; antimicrobial

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1. Introduction

Plants in the form of whole plants, vegetables, fruits, whole grains, and nuts provide various phytochemicals like phenolic compounds, terpenoids, alkaloids, pigments, and other natural antioxidants [1,2]. These phytochemicals are nonnutritive substances that possess large health-protective benefits [3]. Over 80% of the world's population relies on the traditional medical system to treat their health issues [4].

Friedelin (friedelan-3-one) is a pentacyclic triterpene first isolated from bark in 1807 using alcohol and called "cork alcohol" [5]. Later it was isolated from various plant species from different families [6–8] and also reported to isolate from lower plants like mosses [9], lichen [10,11], algae [12], and fungi [13]. In recent years, a substantial number of research studies have demonstrated extraordinary pharmacological actions of friedelin such

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A review on assessment and management of dementia

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Abstract- Dementia is a syndrome characterized by progressive deterioration in several cognitive domains, resulting in substantial functional impairment. Dementia is one of the most expensive and disabling diseases associated with aging, although it is frequently misdiagnosed in basic care. In the long-term care situation, dementia is a common but potentially underdiagnosed condition. Targeted screening for dementia should be standard practice, as a dementia diagnosis will help the patient's care. The assessment of dementia should be done in stages and suited to the demands of the particular patient. Care for cognitive changes, behavioral changes, functional problems, and emotional concerns are all part of dementia management. It also includes the management of various illnesses in light of the dementia, as well as consideration of the wants and desires of the patients. Dementia management entails caring for cognitive changes, behavioral changes, functional problems, and emotional concerns. It also includes the management of other conditions in light of the dementia, consideration of the caregiver's requirements and well-being, and a focus on advanced care planning. This all-encompassing approach to dementia treatment may reduce the disease's morbidity and mortality rate. Along with a clear prognosis and consideration of quality of life issues, this care approach provides patients and their families with vital information and services. This review specifically examines assessment, aetiology and explores strategies for management of dementia.

Key words: Dementia, Assessment, management, morbidity, mortality

INTRODUCTION

Dementia is a complex and progressive condition characterized by a decline in cognitive function that affects a person's ability to perform everyday activities. It is an acquired loss of cognition in multiple cognitive domains sufficiently severe to affect social or occupational function. It's not a specific disease but rather a syndrome with various underlying causes.[1] The most common type of dementia is Alzheimer's disease, but there are others like vascular dementia, Lewy body dementia, and frontotemporal dementia. Alzheimer's disease is the most common cause of dementia, but often several other conditions causing dementia are present on brain autopsies.[2] The symptoms of dementia include memory loss, impaired reasoning, and changes in behavior. As the condition advances, individuals may struggle with communication, face challenges in problem-solving, and experience personality changes.[3] Dementia can be emotionally challenging for both the affected individuals and their loved ones. Early diagnosis and appropriate management are crucial in providing

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A Review on Physico-Chemical Parameters of the Quality of Water

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ABSTRACT

On this planet, water is one of the natural resources that are considered to be the most valuable. All living things, the majority of natural systems, human health, the production of food, and the growth of the economy all benefit from its presence. Water is becoming extremely polluted with a wide variety of toxins as a result of the rapid growth of the world's population, the spread of industry and improved agricultural methods, and other activities caused by humans. In the current scenario, the water from the river has turned into wastewater as a result of the removal of the garbage from the area through which it flows. Water is an essential resource for the continued existence of humans. The integrity of the water supply is critical to the maintenance of good health. A wide variety of pollutants, both chemical and microbiological, can compromise the quality of drinking water and make it unsafe to consume. These pollutants are the root of many significant health issues. Having access to clean water is crucial in the fight against disease and in the pursuit of improved personal satisfaction. This review paper discusses a variety of physicochemical parameters such as pH, Electrical conductivity, Total Hardness, Turbidity, BOD, COD, Total alkalinity, Chloride, Sulphate, Phosphate and DO. that are relevant to thinking about the quality of water.

Keywords: Physio-chemical parameters, Electrical conductivity, BOD, COD

INTRODUCTION

Almost 70% of India's surface water resources and an increasing percentage of its groundwater reserves are contaminated by biological, toxic, organic, and inorganic contaminants, making water pollution a severe issue in India. In many instances, these sources are no longer fit for human consumption or other uses, including as irrigation or industrial purposes. This demonstrates that decreased water quality can lead to water scarcity by reducing its availability for human and ecological usage [1, 2]. In recent years, the need for residential water has multiplied due to population growth, agricultural expansion, and industrial expansion. Not only has improper waste disposal and excessive resource extraction harmed the quality of tap water, but also ground water. There is a wide range of causes for water contamination. The sewage from cities and industrial waste from factories are the two biggest polluters of rivers. There is not a single city in India with sufficient sewage treatment facilities. Almost 10% of our wastewater is treated before being released into local waterways. The result is the contamination of subterranean water supplies, surface water systems, and aquatic ecosystems [3, 4]. The water that flows through these pipes and into our homes is typically highly contaminated and hosts disease-causing microorganism. Another important