Glycosylation

Protein glycosylation is the binding of sugars (also called glycans or carbohydrate structures) to proteins. The product of this process is called a glycoprotein. Protein glycosylation is an essential process; half of the human proteins are glycosylated.

Congenital Disorders of Glycosylation

Glycans play an important role in the normal function of glycoproteins, for example: regulation of protein expression, maintenance of protein structure and stability, modulation of enzyme activity and cell migration. It is therefore understandable that genetic defects leading to impaired protein glycosylation can cause various phenotypes with often serious consequences. These recently identified disorders are called Congenital Defects of Glycosylation (CDG). PMM2-CDG (formerly CDG Ia), a so-called N-type glycosylation defect, had already been described in 1987 but was not characterized until 1995. The number of CDG subtypes has been growing ever since.

Subtypes

This spectrum of severe, inherited metabolic diseases, characterized by impaired protein glycosylation, causes severe symptoms throughout the whole body. So far, approximately 300 patients have been diagnosed with PMM2-CDG. These patients form the largest subgroup within the large CDG cohort. The other subtypes comprise far less patients. The only, so far known, treatable CDG subtype, PMI-CDG (formerly CDG-Ib), for example, is represented by only 30 patients.

Clinical features

The clinical features with which CDG patients present are extremely diverse, symptoms can vary widely even between patients with the same CDG subtype. Disease severity is highly variable between patients as well. Frequently seen symptoms of CDG are psychomotor retardation, muscle hypotonia, dysmorphias (for example inverted nipples) and coagulation disorders.