



Congenital Disorders  
of Glycosylation



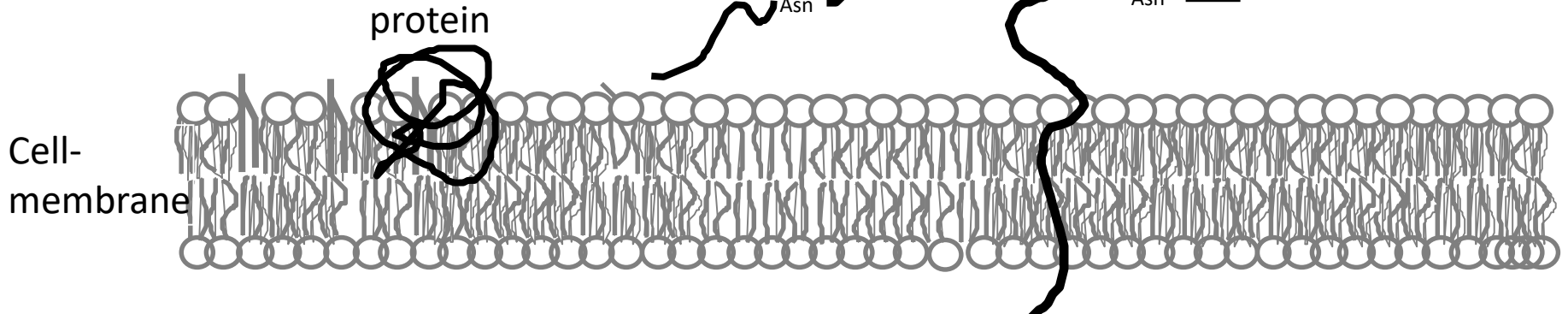
# Dietary Therapies for CDG

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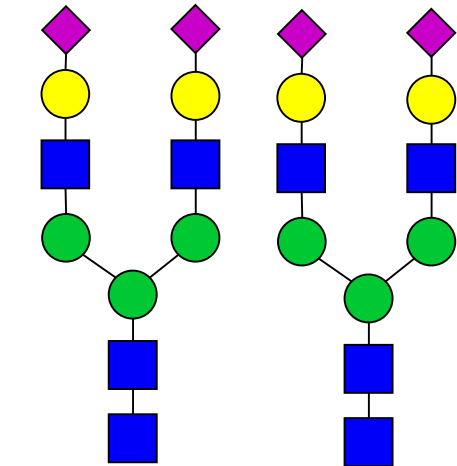
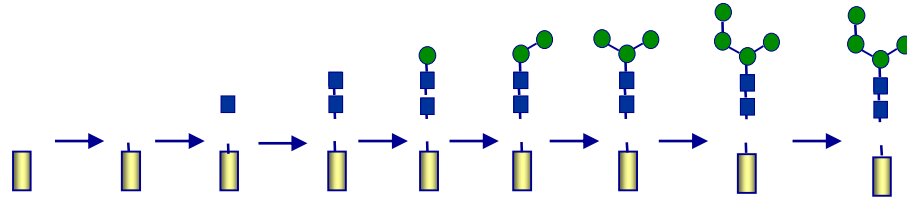
# Glycans and the sugar code

- = Glc
  - = Gal
  - = Man
  - = GlcNAc
  - ▲ = Fuc
  - ◆ = Sia
- sugars

## Glycoproteins

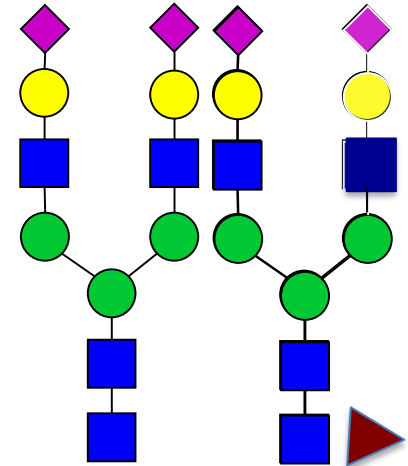


# Congenital Disorders of Glycosylation



Missing glycan chains

CDG disorders:  
two types

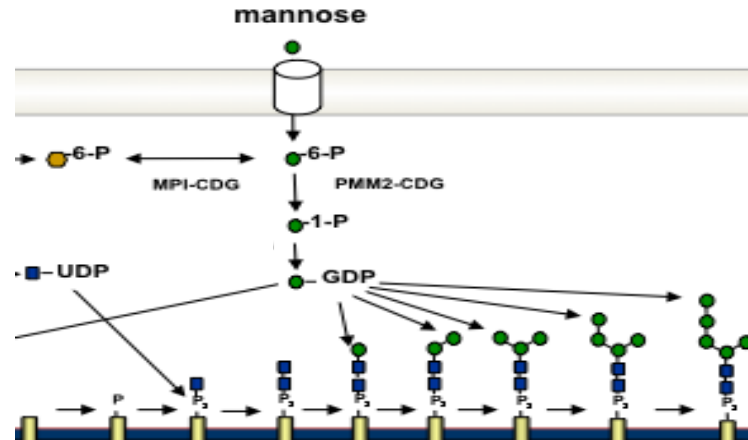


Missing sugars

# What are dietary therapies?

“Glycosylation” (sugar chain building) relies on the 1. activity 2. availability and 3. proper order of different sugars, used as building blocks.

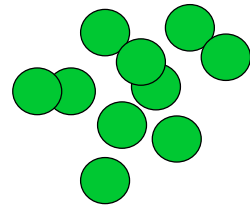
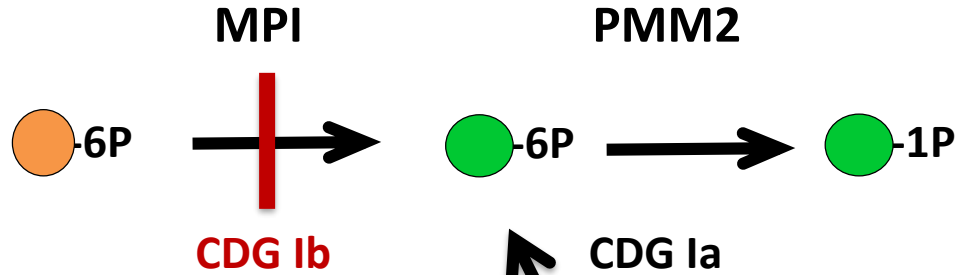
Different sugars get build in to the sugar chains, which at the end are added to proteins and lipids.



Dietary therapies **provide the patient with a specific sugar or supplement**

**NOT FOR CALORIES!**

# MPI-CDG (CDG Ib)



Mannose  
supplementation

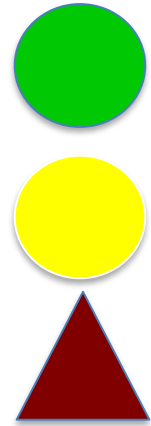


# How and why can they be used for CDG?

**mannose** 200mg/kg 4-6 times a day

**galactose** 1-1.5 g/kg

**fucose** Individualized dosis



*Sialic acid compounds (GNE)*

*N-Acetylmannosamine/sialic acid?*

Oral powder  
supplements

GlcNAc, ManNAc, GalNAc?, Uridine, manganese, etc

# Benefits

## Data supports benefit of sugars

- MPI-CDG
- PGM1-CDG
- TMEM165-CDG
- SLC35A2-CDG
- SLC39A8-CDG
- SLC35C1-CDG

## Published evidence

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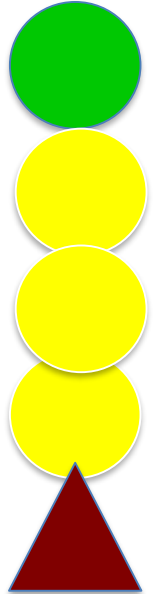
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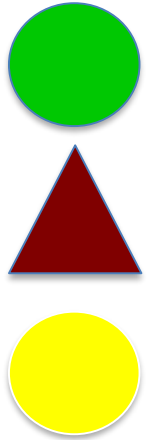
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# Risks (side effects/intolerance)

- Jaundice, anemia, high “blood sugar”
- Immune reaction if patient has Anti-H antibody
- Diarrhea?



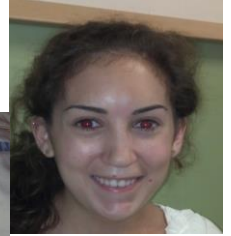
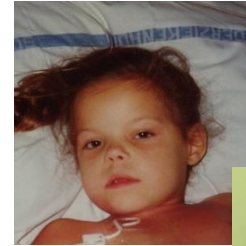


# How can families access them?

- Several companies offer “over the counter” sugars and nutritional supplements (see Amazon.com) **Safety?**
- In the USA Solace Nutrition provides Galaxtra
- Raresugars.com supplies Mannose, D-Galactose and Fucose in Canada as well as in the USA
- Cerecor is developing FDA approved sugar supplements
- European order/prescription is unfair and unequal (some countries do have access, like Germany, Skandinavia etc), no provider in the Netherlands etc.

# Main challenges for the use of dietary therapies

- No clinical trials, except for PGM1
- No FDA approved rare sugar available
- Difficult to order
- Expensive
- Compliance is variable (patients do not like to take a lot of powdered sugar)



## Other nutritional therapies

- Uridine (CAD-CDG and additional supplement in SLC35A2-CDG)
- Manganese in SLC39A8-CDG and TMEM165-CDG (?)
- Ketogenic diet in CDG with intractable seizures (GPI-anchors?)

# Conclusions and future perspectives



**CLINICAL TRIALS ARE ONGOING AND ESSENTIAL**