



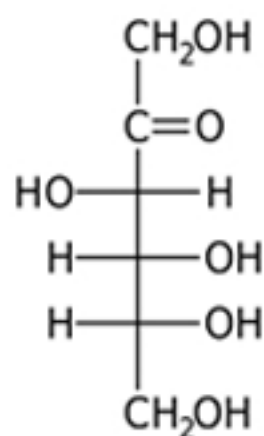
# Carbohydrates

## Session Slides with Notes

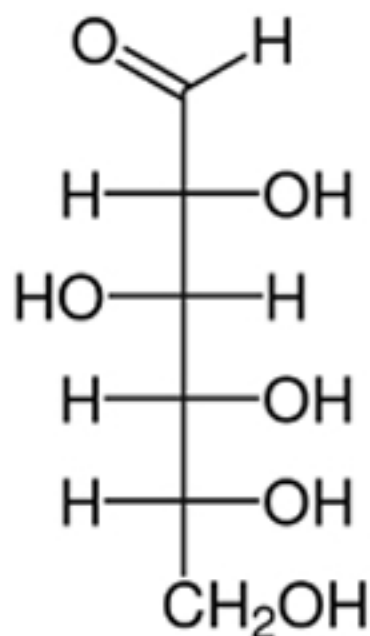
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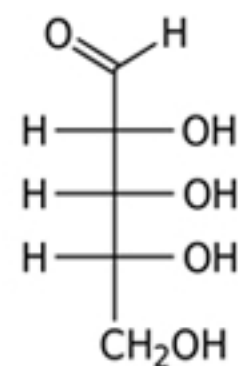
# Carbohydrates



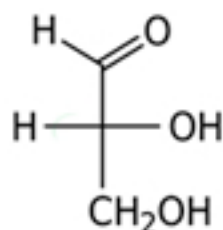
Fructose



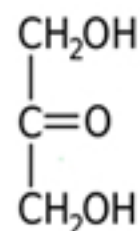
Glucose



Ribose

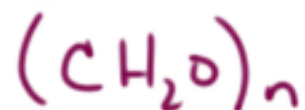


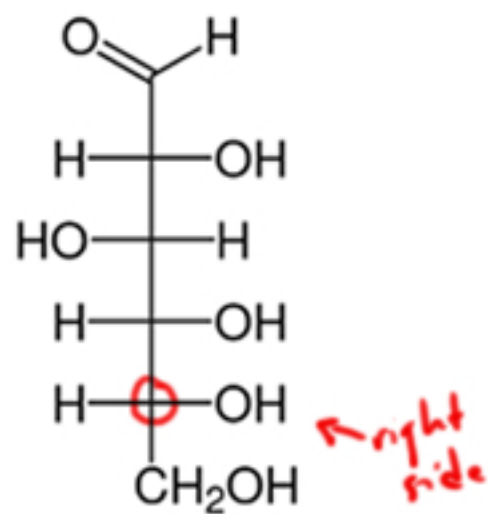
Glyceraldehyde



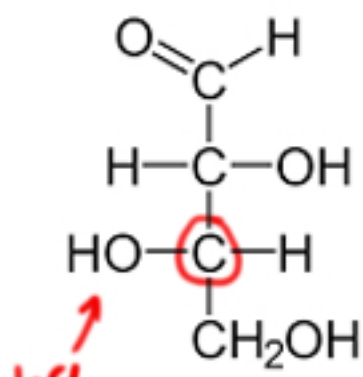
Dihydroxyacetone

Simple  
sugars





D

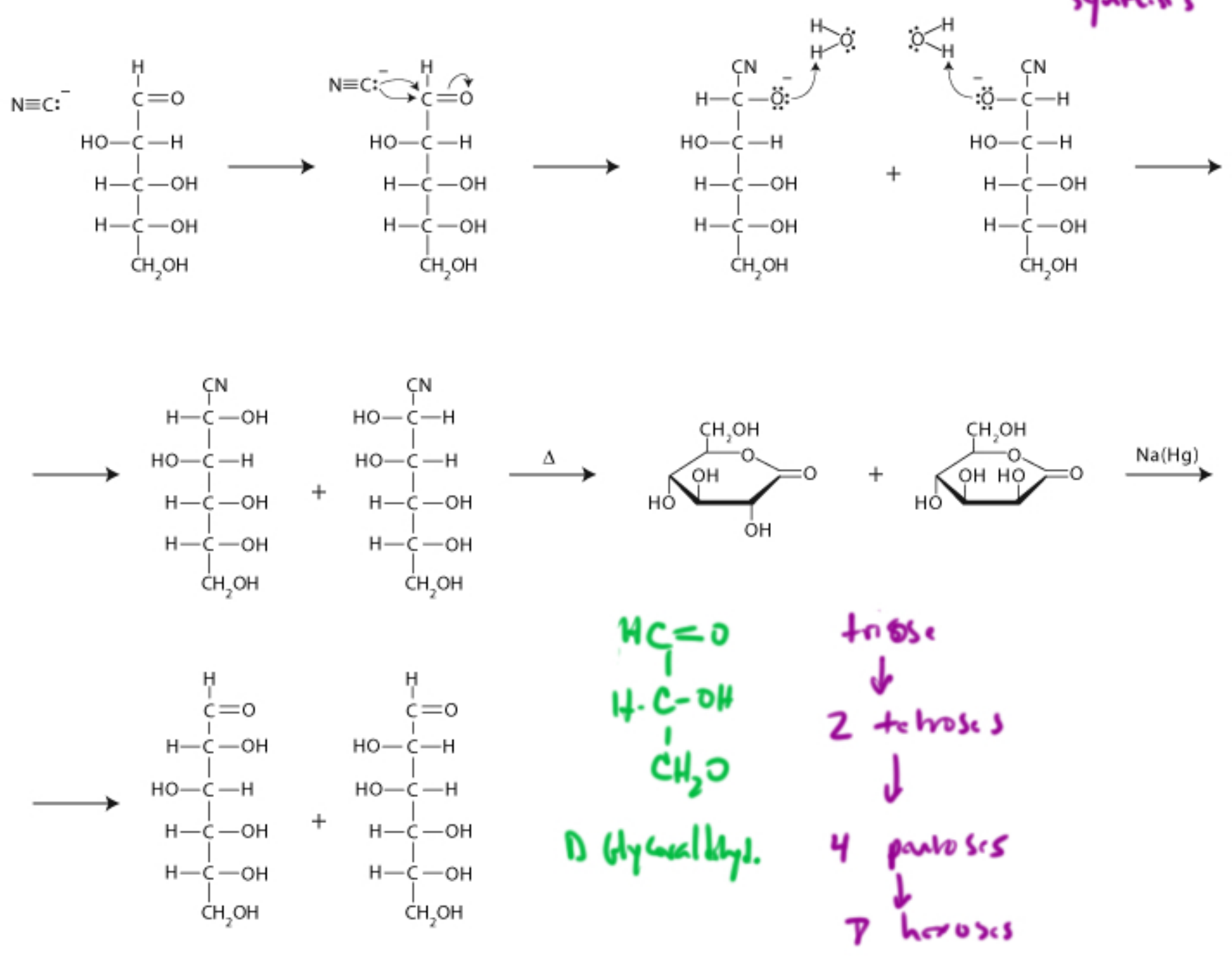


L



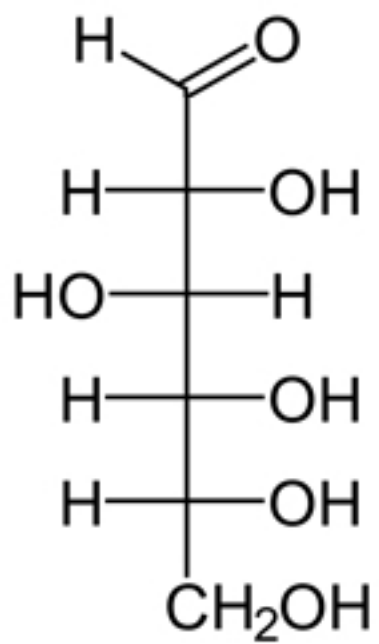
(not d or l)

# Kiliani Fischer Synthesis

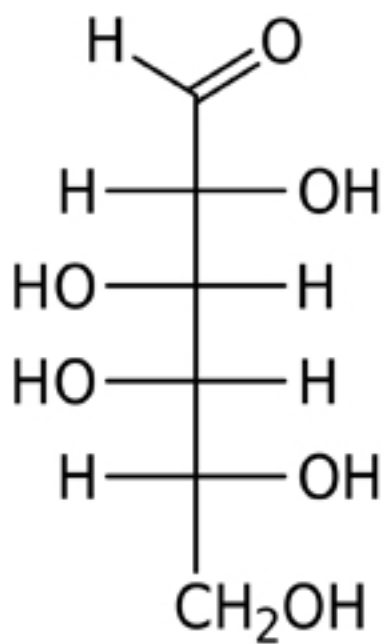


Steps of the Kiliani-Fischer synthesis of D-glucose and its C-2 epimer, D-mannose, from D-arabinose

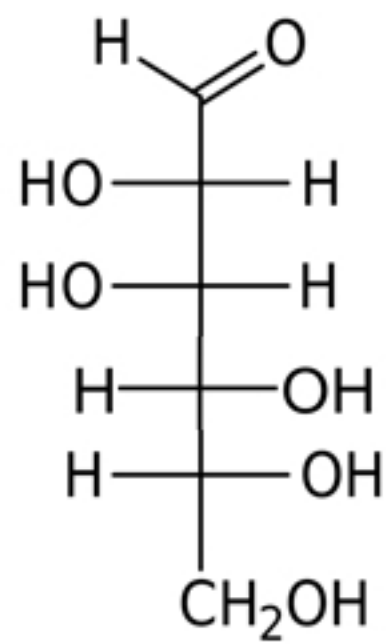




Glucose

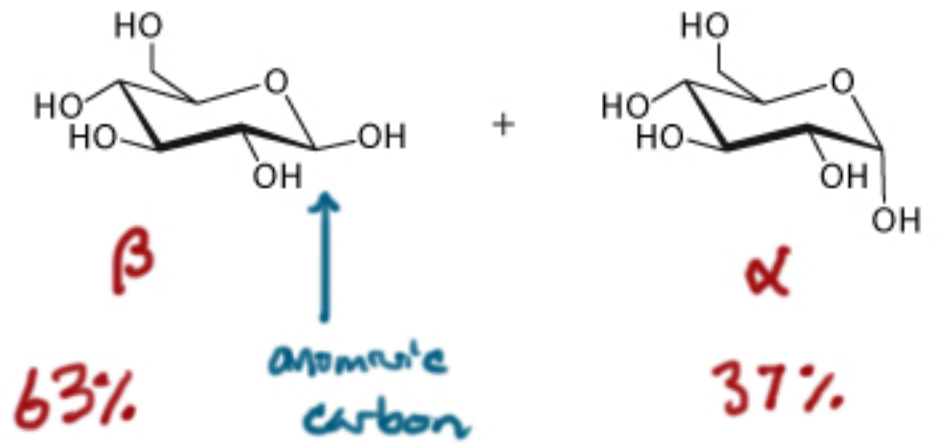
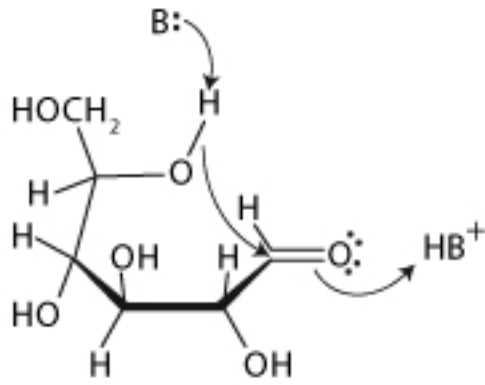


Mannose



Galactose

# Ring Formation in Glucose (Hemiacetal formation)



$$\Delta G^\circ = -2.3RT \log K$$

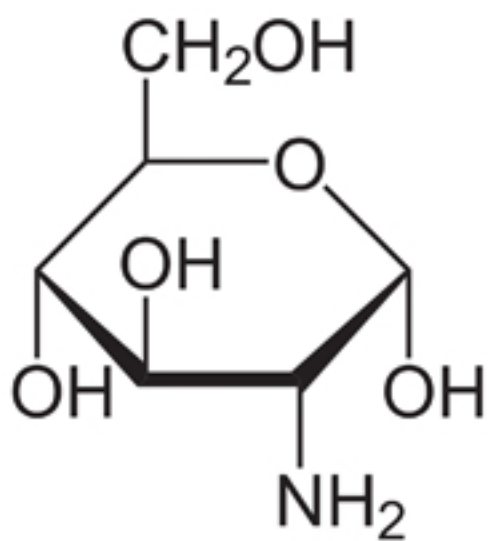
$$= (-2.3)(8)(300)(0.3)$$

$$\sim -1600 \text{ J}$$

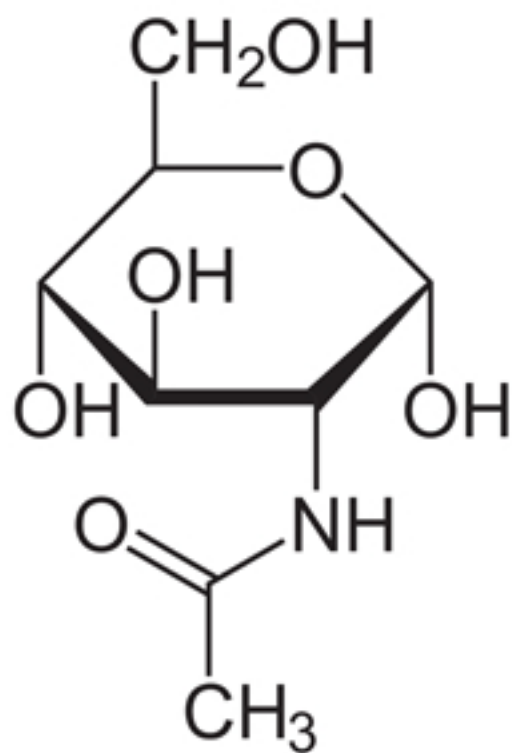
$$\sim -1.6 \text{ kJ}$$



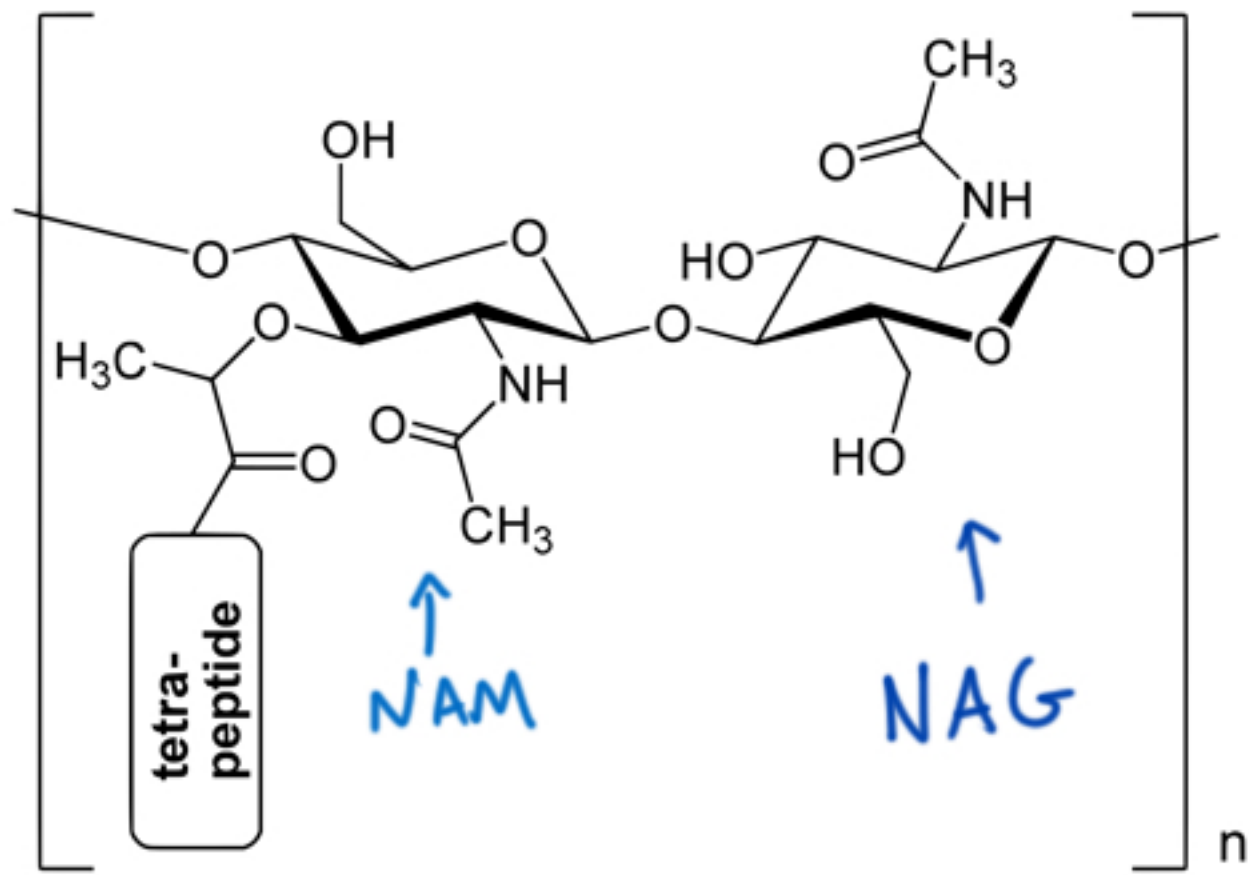




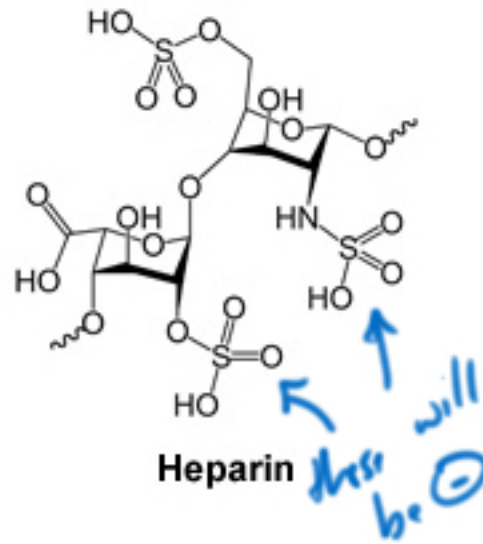
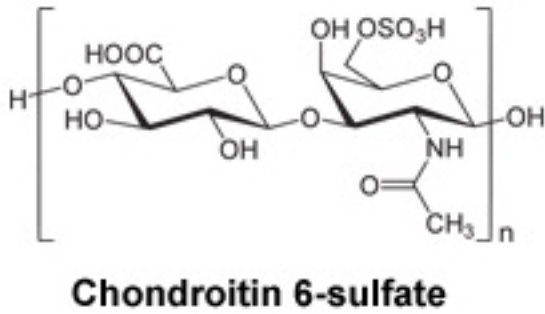
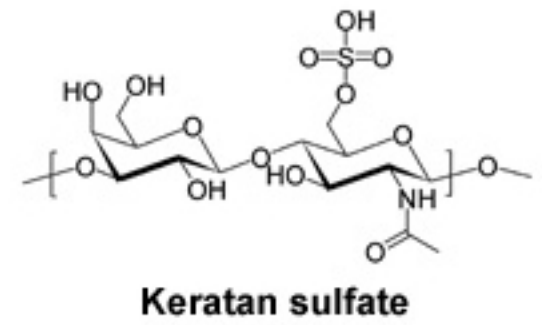
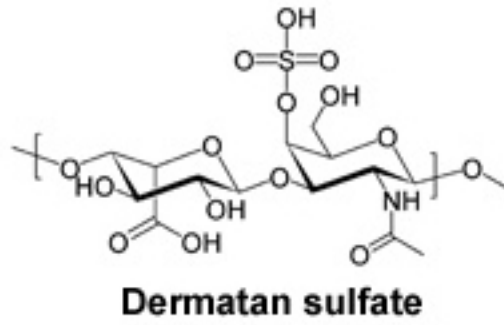
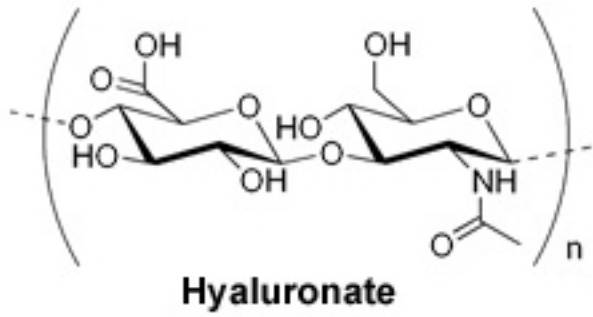
Glucosamine



N-acetyl glucosamine

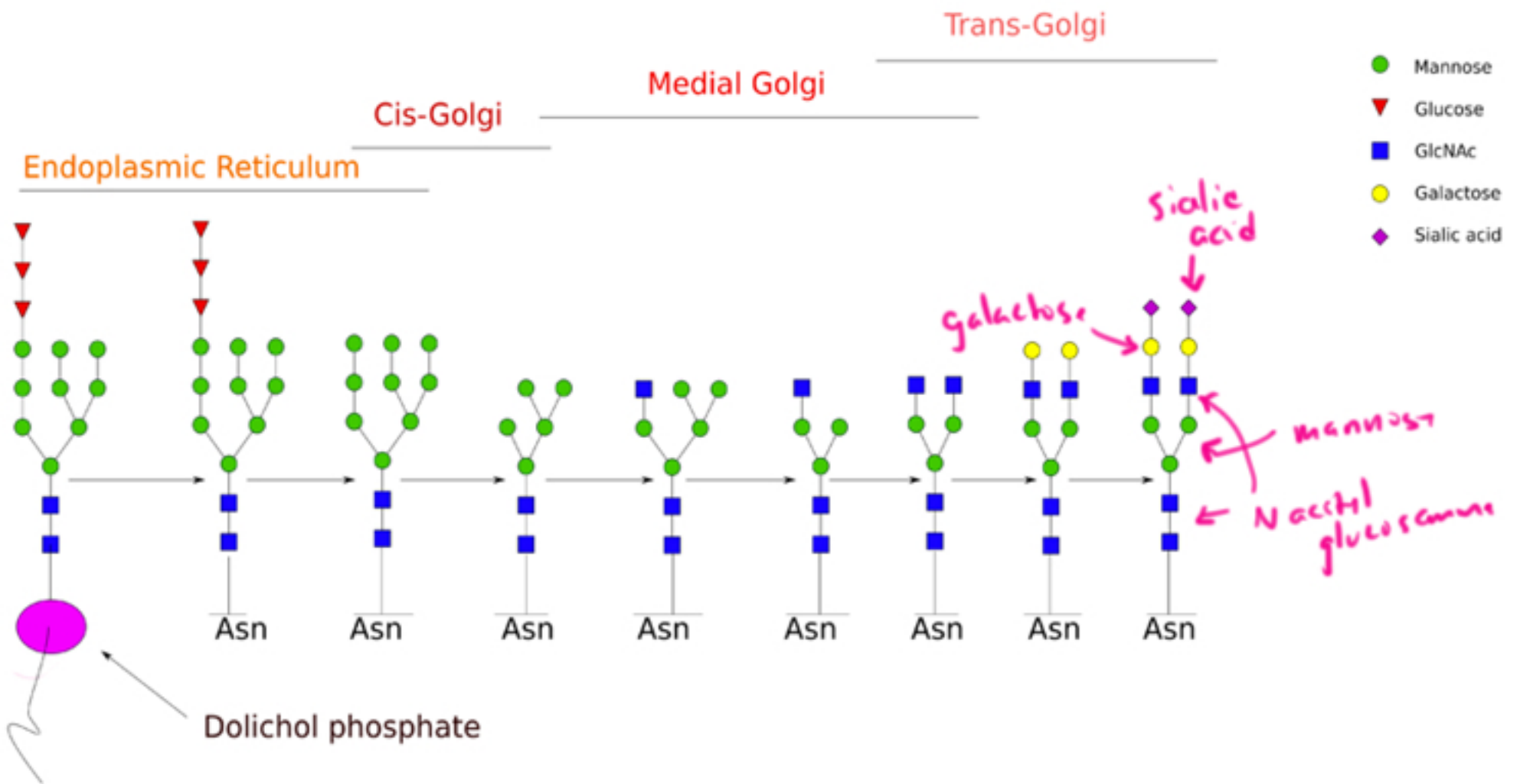


Peptidoglycan

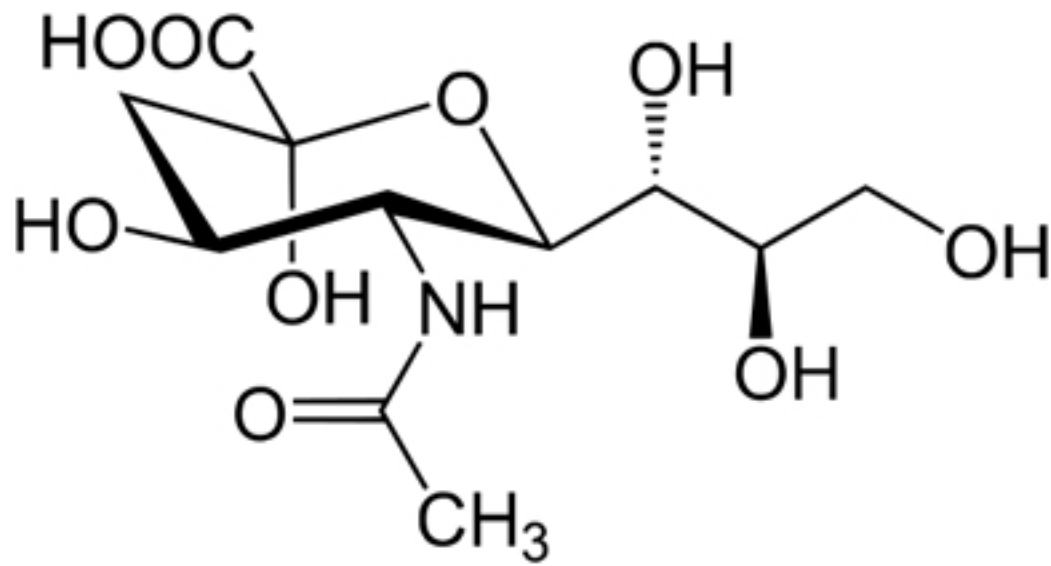


acidic derivatives  
of N-acetyl glucosamine  
is proteoglycan

$$pH = pK_a + \log \left( \frac{[A^-]}{[HA]} \right)$$



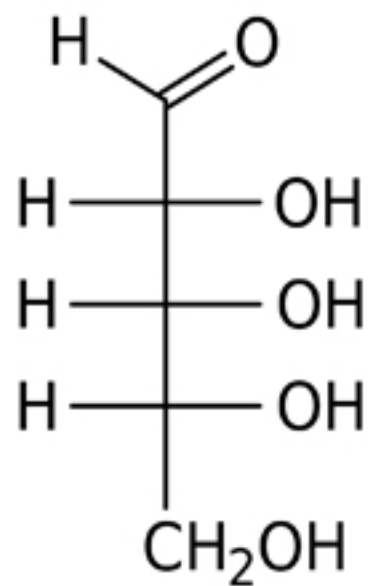
N-linked glycosylation  
to form glycoproteins



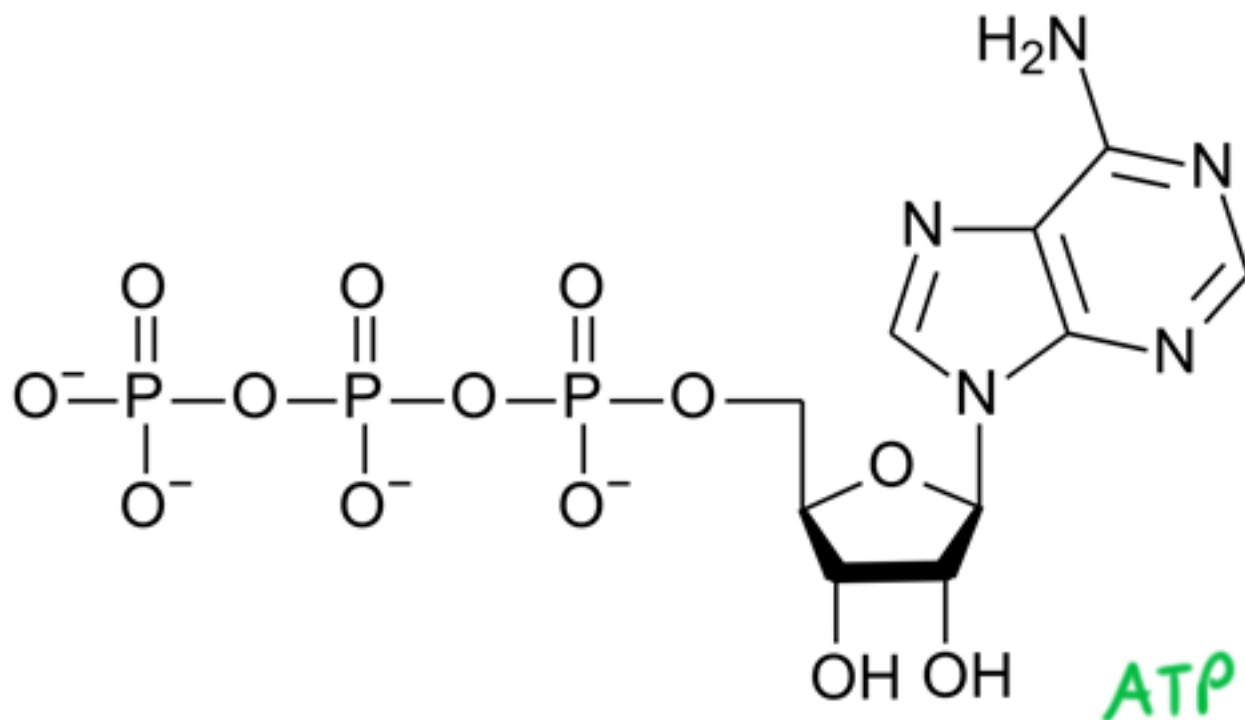
a sialic acid

glycoproteins  
and gangliosides

↑  
a kind of  
sphingolipid

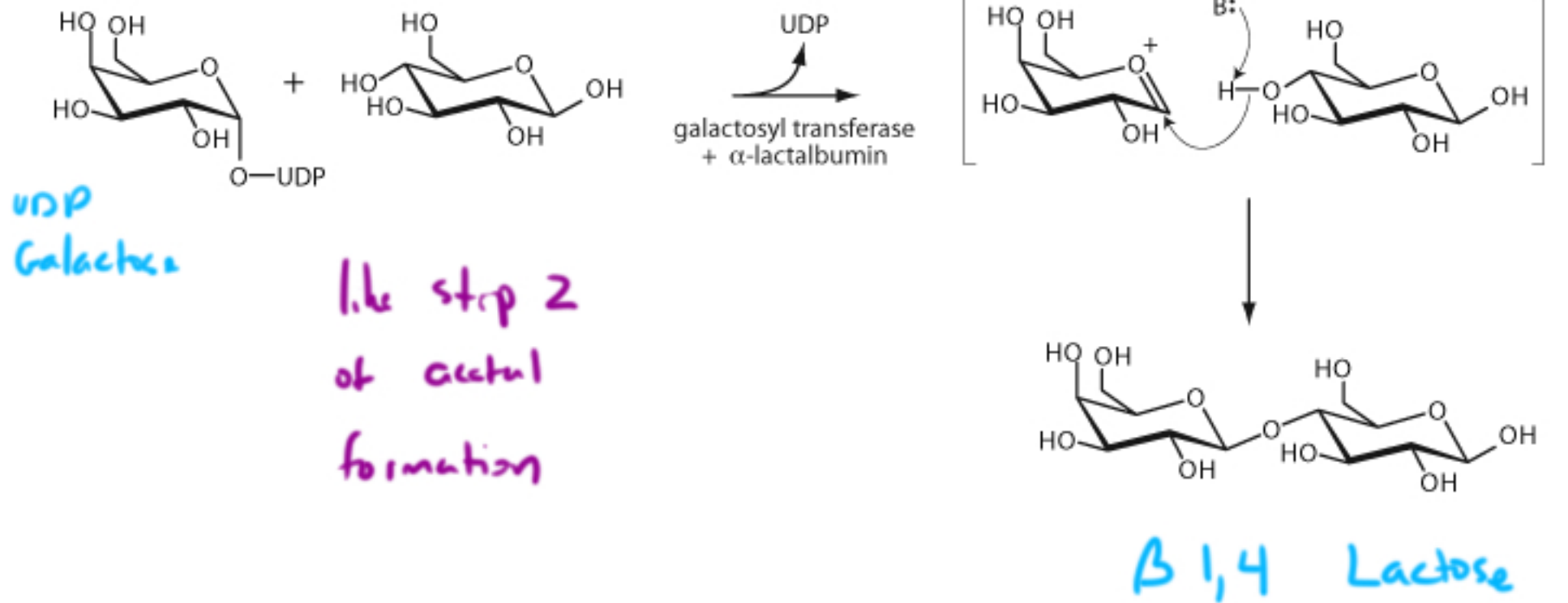


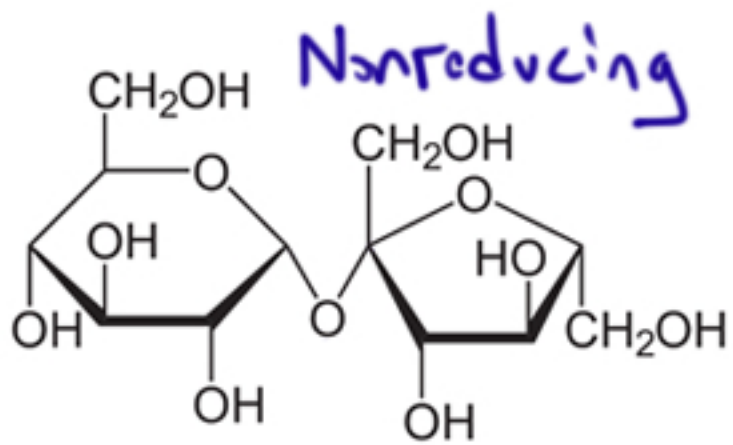
Ribose



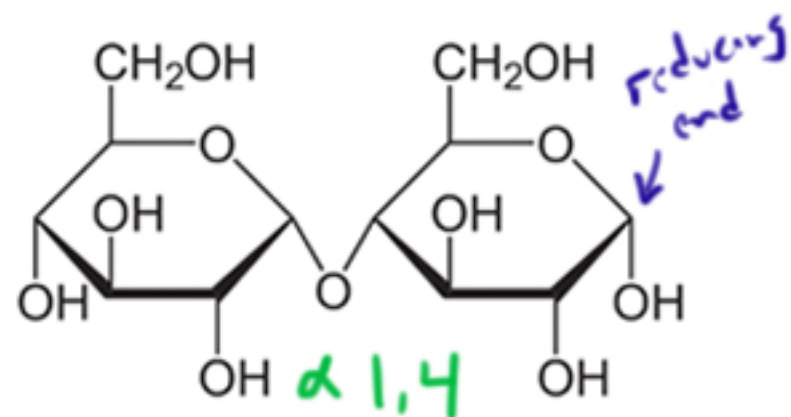
ATP

# Glycosidic Bond Formation

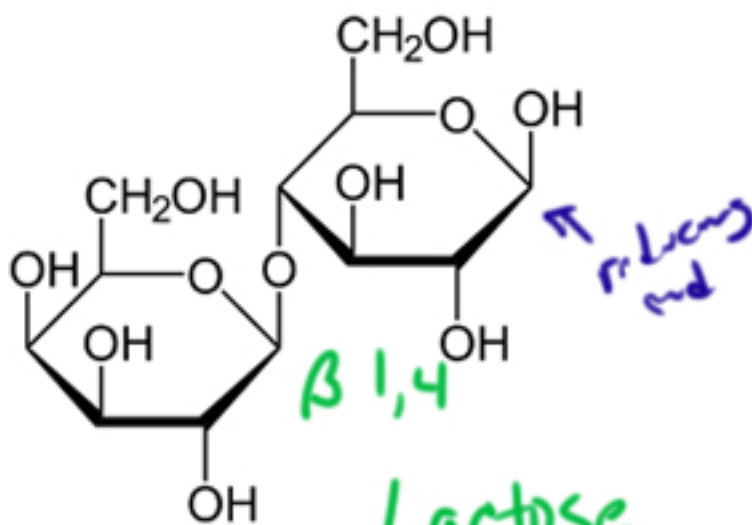




Sucrose  
glucose +  
fructose

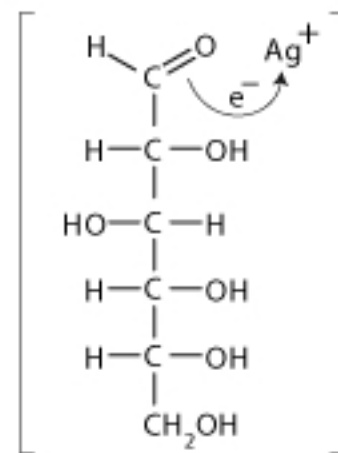
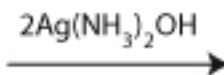
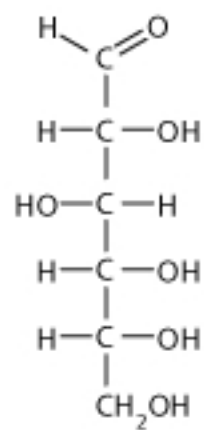
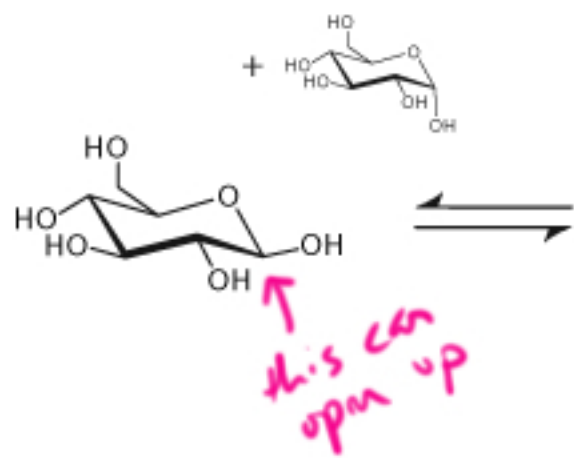


Maltose  
glucose  
+  
glucose

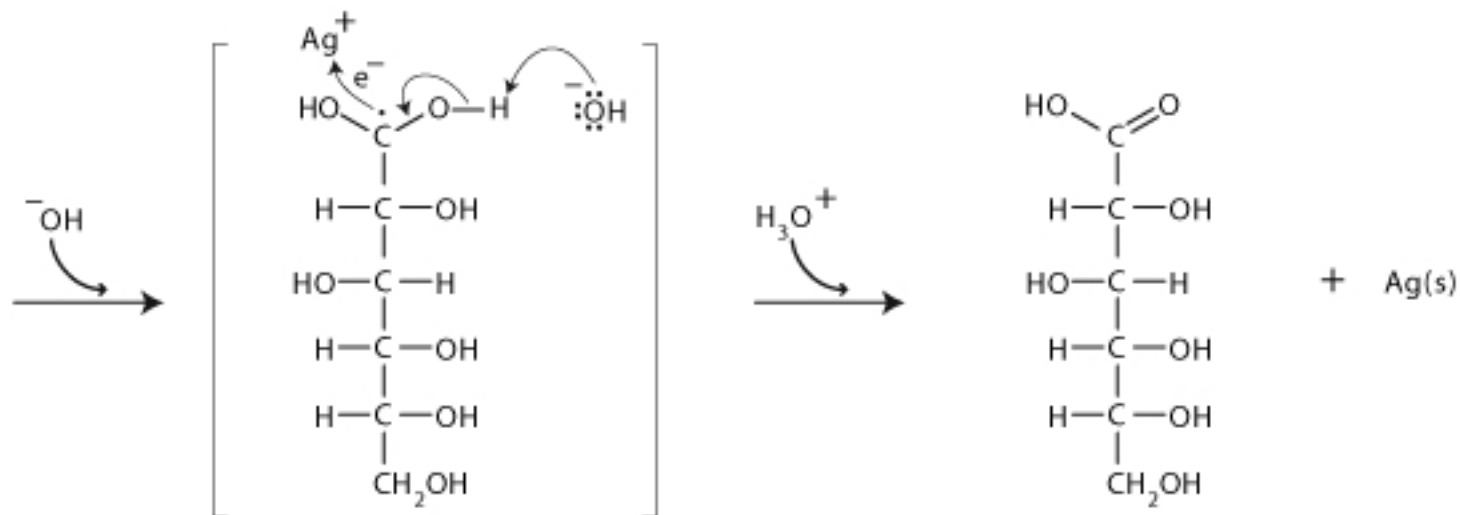
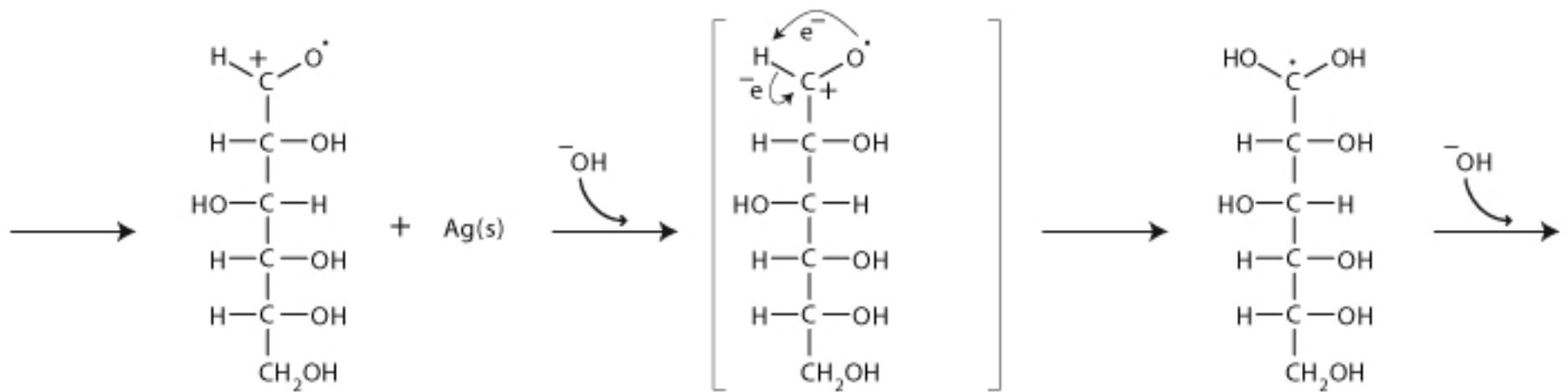


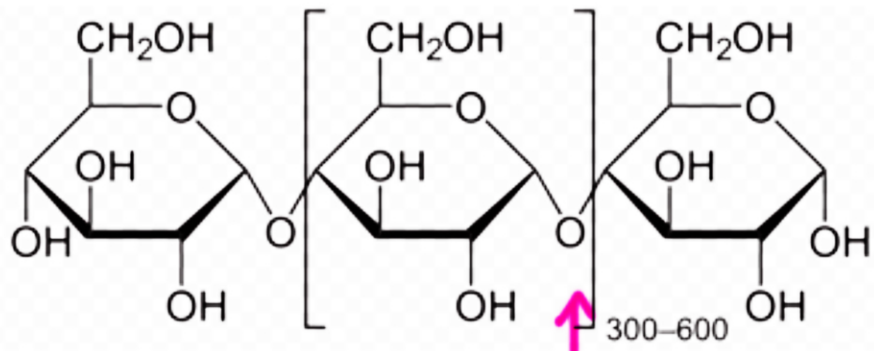
Lactose  
glucose  
+  
galactose





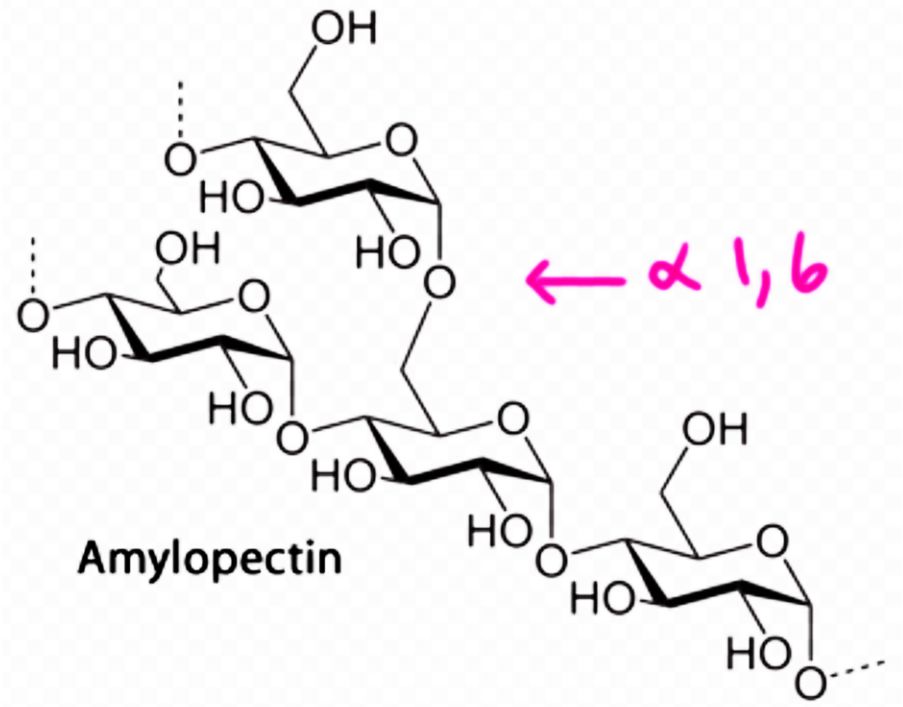
Tollens Test





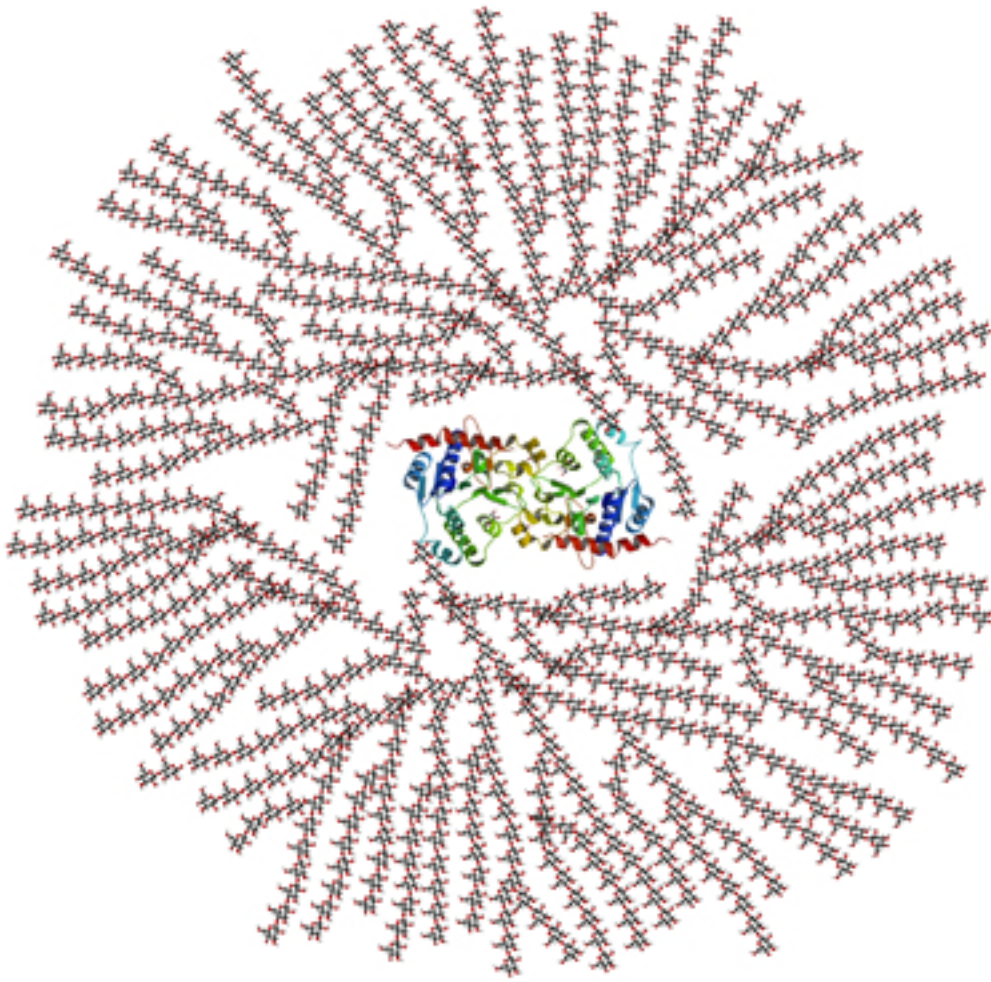
Amylose

$\alpha 1,4$



Amylopectin

Glycogen



← non-reducing ends  
←