OVERHEADS – CARBOHYDRATES

MONOSACCHARIDES

5-Carbon
- RIBOSE (RNA)
- DEOXYRIBOSE (DNA)

6-Carbon from Aldehyde
- ARABINOSE

6-Carbon from Ketone
- FRUCTOSE

POLYSACCHARIDES

STARCH (2 Fractions)
- AMYLOSE (\textit{Water soluble})
  - 60-300 Glucoses in Chain
- AMYLOPECTIN (\textit{Water insoluble})
  - 300-6000 Glucoses in Branched Chains

DEXTRINS
- Several Glucoses in chain
  - (old postage stamp glue)
- Dextrimaltose
  - Two (maltose) to a very few glucoses in chain (infant formula; malted milk)

DISACCHARIDES

SUCROSE (Glucose + Fructose)
MALTOSE (2 Glucoses)
LACTOSE (Glucose + Galactose)
  - (\textit{Milk Sugar})

GLYCOGEN
- (Starch storage form of glucose in liver; like amylopectin but attached to protein)

DEXTRANS
- (Dental Plaque –)
  - Very highly branched glucose polymer

SUCROSE
MORE OVERHEADS – CARBOHYDRATES

α-D-GLUCOSE
(a pyranoside = a 6-membered ring)

β-D-FRUCTOSE
(a furanoside = a 5-membered ring)

\[
\text{ROH} + \text{HO-NO}_2 \overset{(\text{H}_2\text{SO}_4)}{\longrightarrow} \text{RO-NO}_2 \oplus \text{HOH}
\]

Nitrate ester

```
ROH  +  HO-NO2  (+ HOH)
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NITROCELLULOSE

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CH2-O-NO2
CH-O-NO2
CH2-O-NO2
nitroglycerin
```

\[
x \rightarrow 12\text{CO}_2 + 10\text{H}_2\text{O} + 6\text{N}_2 + \text{O}_2
\]

(No extra oxygen needed for detonation)
Starch

Maltose unit

α-linkages

2-D-Glucopyranose unit

Amylose $H_2O$-soluble (10-25%)

Amylopectin $H_2O$-insoluble

A branched polysaccharide:
MORE OVERHEADS – CARBOHYDRATES

**Cellulose** - a polysaccharide

major constituent of plants:

Cellulose unit

β-d-Glucopyranose unit

β-linkages

Cellulose

(300–12,000 units)

Cellulose

\[
\begin{align*}
\text{HNO}_3 & \quad \text{HNO}_3 \\
\text{Cellulose} & \quad \text{Cellulose nitrate (gun cotton)}
\end{align*}
\]

Cellulose

\[
\begin{align*}
\text{CH}_3\text{COCH}_3 & \quad \text{CH}_3\text{COCH}_3 \\
\text{Cellulose} & \quad \text{Cellulose acetate}
\end{align*}
\]