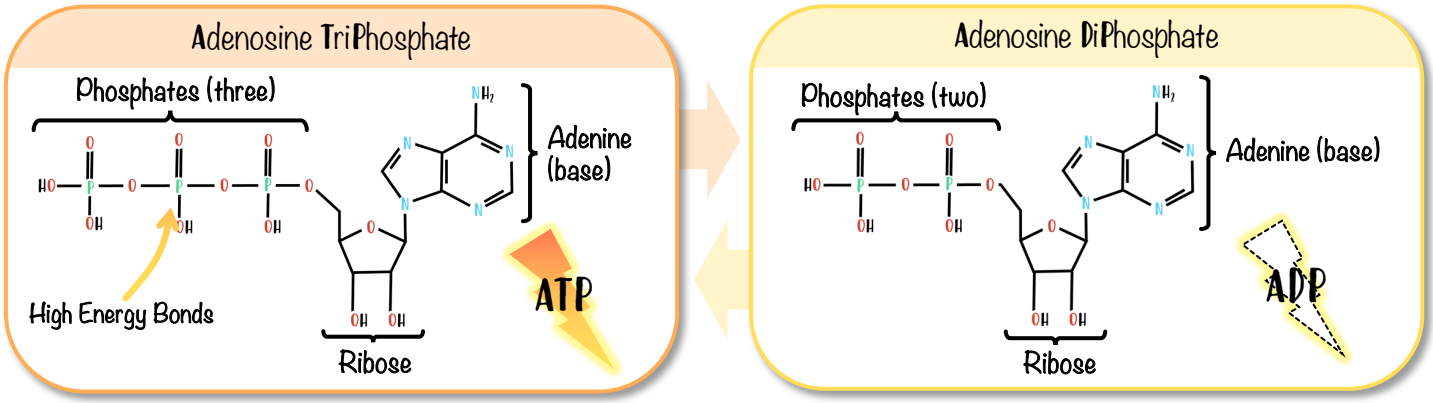
C1.2

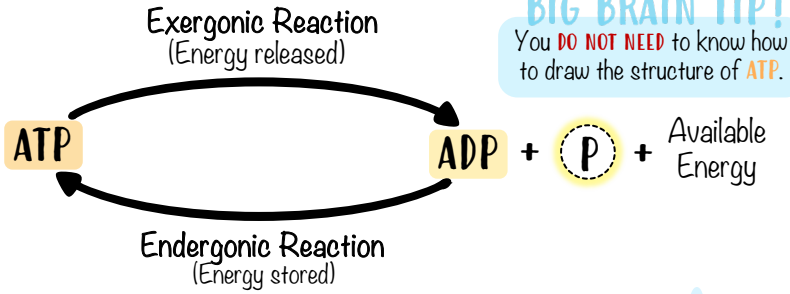
Cellular Respiration

CELLULAR RESPIRATION – Gradual breakdown of nutrient molecules such as glucose & fatty acids in a series of reactions that ultimately release energy in the form of **ATP**.



FUNCTIONS OF ATP

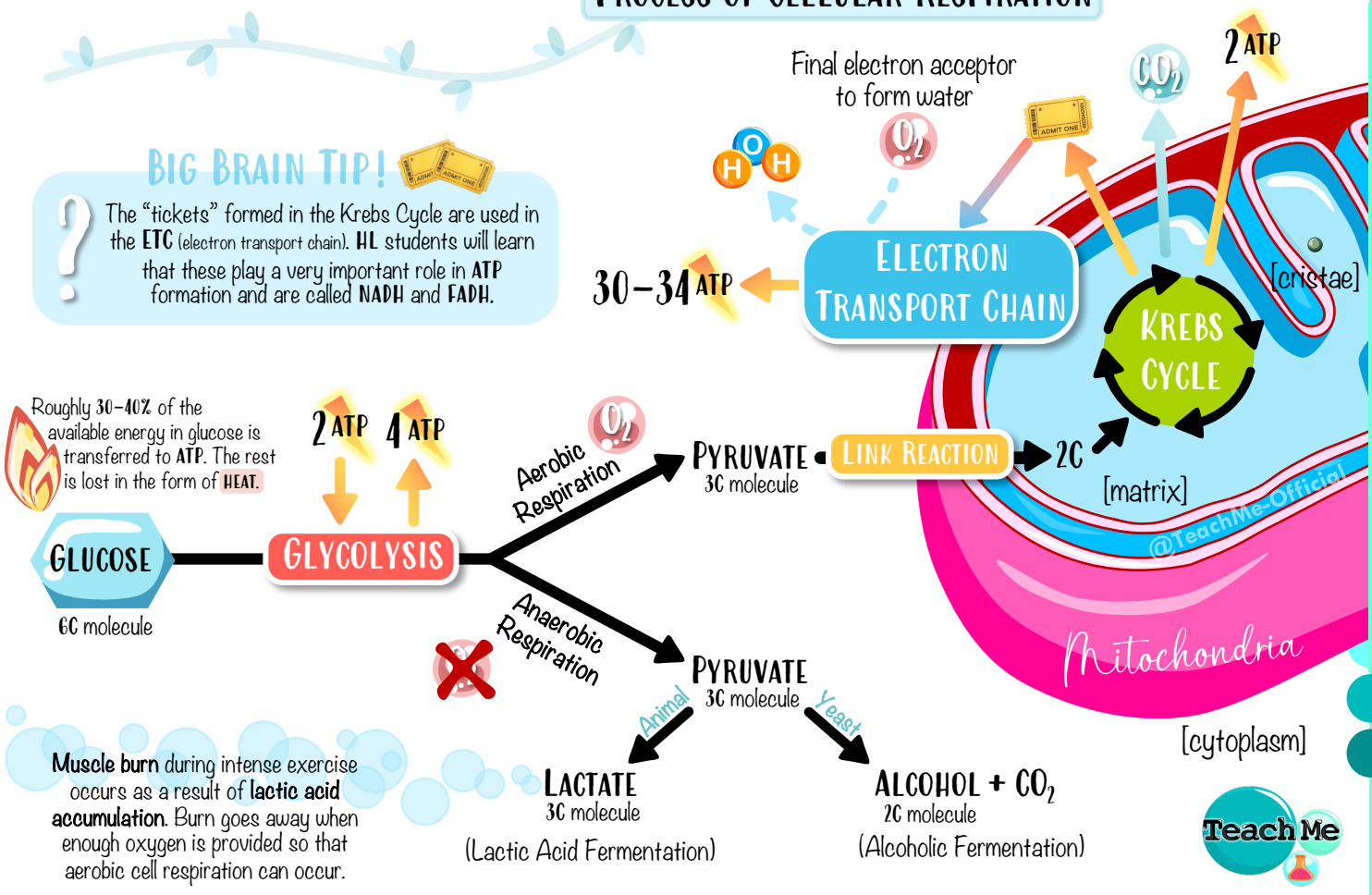
- **Membrane Transport**
  Active transport
- **Synthesis Of Macromolecules**
  Anabolism
- **Movement Of Cell**
  Cilia or flagellum action
- **Cell Component Movement**
  Such as chromosomes in mitosis or meiosis



BIG BRAIN TIP!
You **DO NOT NEED** to know how to draw the structure of **ATP**.

BIG BRAIN TIP!
The "tickets" formed in the Krebs Cycle are used in the **ETC** (electron transport chain). **HL** students will learn that these play a very important role in **ATP** formation and are called **NADH** and **FADH**.

PROCESS OF CELLULAR RESPIRATION

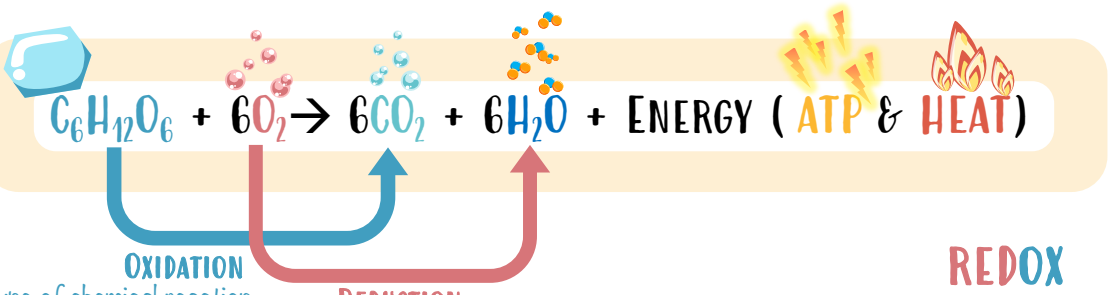


Muscle burn during intense exercise occurs as a result of **lactic acid accumulation**. Burn goes away when enough oxygen is provided so that aerobic cell respiration can occur.

C1.2

Cellular Respiration

Cellular Respiration Equation (Aerobic)



Oxidation
A general type of chemical reaction resulting in products with lower potential energy than the reactants

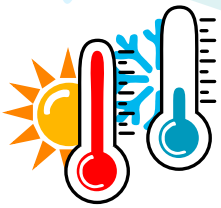
Reduction
A general type of chemical reaction resulting in products with higher potential energy than the reactants

REDOX

Cellular Respiration is considered to be a **REDOX** reaction: when **Oxidation** & **Reduction** occur together.

Anaerobic Respiration	Aerobic Respiration
Requires glucose	Requires glucose
Does **NOT** require oxygen	Requires oxygen
Occurs in cytoplasm	Occurs in cytoplasm & mitochondria
Mechanism: Glucose is split into two molecules of pyruvate. With inadequate oxygen pyruvate will be turned into lactic acid (in animals), and alcohol + CO_2 (in yeast)	**Mechanism:** Glucose is split into two molecules of pyruvate. Pyruvate enters **LINK REACTION.** Then follows **KREBS CYCLE.** Then occurs Electron transport chain (**ECT**) in cristae of mitochondria.
Net gain of **2 ATP** (Little **ATP**)	Net gain of **30-34 ATP** (Lots of ATP)
Final products: **Animals: ATP** & Lactate **|| Yeast:** alcohol & CO_2	Final products: **ATP**, CO_2, & Water

Factors Affecting Cell Respiration

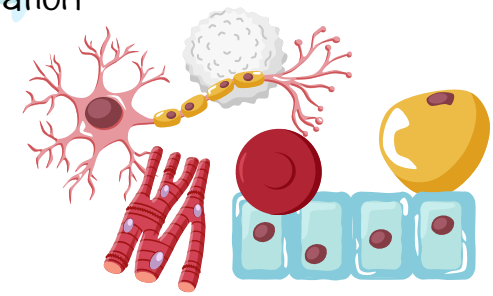


Temperature

Cellular respiration utilises enzymes to catalyse various reactions, they are sensitive to changes in temperature

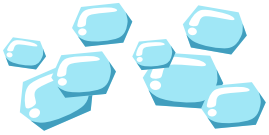
Oxygen and Carbon Dioxide

High concentrations of O_2 will increase the rate of cellular respiration while low CO_2 concentrations will increase the rate



Cell Types

Different types of cells will require different amounts of energy – for example muscle cells and neurons will have higher requirements thus higher respiration rates



Glucose Concentration

Higher concentrations of glucose increase the rate of cellular respiration

A **respirometer** is often used to calculate the rate of cell respiration

notes