What Happens in Respiration and Where - **Answers**

Glycolysis
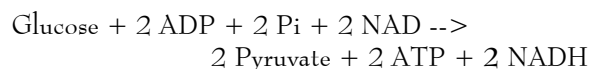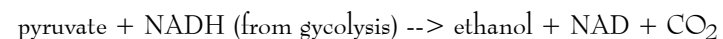
Glucose + 2 ADP + 2 Pi + 2 NAD -->
$\qquad$ 2 Pyruvate + 2 ATP + 2 NADH

Occurs in what part of the cell? **cytosol**

Present in:

$\qquad$ Respiring grain $\qquad$ **yes**

$\qquad$ Fermenting yeast $\qquad$ **yes**

Alcoholic Fermentation

pyruvate + NADH (from gycolysis) --> ethanol + NAD + CO_2

Occurs in what part of the cell? **cytosol**

Present in:

$\qquad$ Respiring grain $\qquad$ **no**

$\qquad$ Fermenting yeast $\qquad$ **yes**

Is essential to anaerobic respiration in that it regenerates the NAD.

Lactate Fermentation

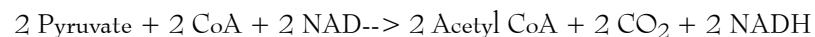pyruvate + NADH (from gycolysis) --> Lactic acid + NAD
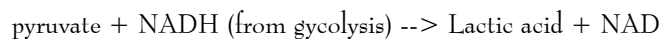
Occurs in our muscles when we exercise anaerobically.

Advantages over alcoholic fermentation:

Also regenerates NAD but does not generate carbon dioxide. If the cardiovascular system can't meet the needed oxygen demand it can't cope with the generated carbon dioxide either.

Gateway Reaction

2 Pyruvate + 2 CoA + 2 NAD--> 2 Acetyl CoA + 2 CO_2 + 2 NADH

Occurs in what part of the cell? **Matrix of mitochondrion**

Present in:

$\qquad$ Respiring grain $\qquad$ **yes**

$\qquad$ Fermenting yeast $\qquad$ **no**

Krebs Cycle

2 Acetyl CoA + 2 FAD + 6 NAD+ 2 ADP

    --> 2 ATP + 4 CO_2 + 2 $FADH_2$ + 6 NADH

Occurs in what part of the cell?
        Matrix of mitochondrion

Present in:

    Respiring grain   **yes**

    Fermenting yeast   **no**

Demonstrated by:

    CO_2 release   **yes**

    0_2 Consumption   **indirectly**

    Tetrazollim Stain   **indirectly**

    Elevated Temp.   **yes**

Electron Transport Chain

($FADH_2$ or NADH) (from gycolysis, the gateway reaction or the Krebs Cycle) + 0_2-->
    water + (FAD or NAD)
        + 3 ATP per NADH from the Gateway Reaction
        + 3 ATP per NADH from the Krebs Cycle
        + 2 ATP per $FADH_2$ from the Krebs Cycle
        + 2 ATP per NADH from the Gycolysis

Occurs in what part of the cell?
        Cristae of the mitochondia

Present in:

    Respiring grain   **yes**

    Fermenting yeast   **no**

Demonstrated by:

    Phenol Red   **indirectly**

    Elevated Temp.   **indirectly**

    Tetrazollim Stain   **yes**

What is the total efficiency of aerobic respiration starting with glucose ? **38%**

$$\frac{(\text{7.3 Kilocalories per ATP}) \times (\text{36 ATPs per glucose})}{\text{686 Kilocalories per Glucose}} \times 100$$