Pyruvate and Lactate: Student Handout

Key Concept

When the body breaks down glycogen (stored carbohydrate) for energy, it produces pyruvate. The pathway pyruvate takes depends on oxygen availability.

Pathways of Pyruvate

- **With oxygen (aerobic):** Converted into acetyl-CoA, enters the Krebs cycle, and produces efficient ATP.
- **Without oxygen (anaerobic):** Converted into lactate, allows continued energy production but less efficient.

Why Lactate Matters

- Not just a waste product — lactate can be recycled by the liver (Cori Cycle).
- Provides short-term energy to sustain high-intensity exercise.
- Explains why sprints and heavy lifts are possible even with limited oxygen.

Student Takeaway

Pyruvate is a central 'fork in the road':
- With oxygen → acetyl-CoA → efficient aerobic energy
- Without oxygen → lactate → quick anaerobic energy

Lactate enables short-term performance but contributes to muscle fatigue.