Exercise Metabolism I

I. Rest-to-Exercise Transitions
   A. The oxygen deficit at the onset of exercise
      1. The measurement of O$_2$ consumption (VO$_2$) provides an index of aerobic ATP production
      2. Notice that VO$_2$ does not reach a steady-state value immediately upon exercise, but rather lags behind for the first 2-4 min.
      3. The lag in O$_2$ uptake at the beginning of exercise is termed the O$_2$ deficit
      4. After a steady state VO$_2$ is reached, ATP demand is met through aerobic ATP production
      5. Difference between trained and untrained subjects

   B. Recovery From Exercise: Metabolic Responses
      1. When exercise stops, oxygen consumption DOES NOT return immediately to resting levels rather
      2. Oxygen consumption remains elevated above resting levels
      3. This phenomenon is termed Excess Post-exercise Oxygen Consumption

II. Lactate Threshold
   A. Despite the continual production of some ATP via anaerobic glycolysis during submaximal exercise, blood lactate levels remain relatively constant

   B. However, as exercise intensity increases, a “threshold” is reached in which lactate begins to accumulate in the blood

   C. Mechanisms to Explain the Lactate Threshold

   D. Other Mechanisms for the Lactate Threshold
      1. Failure of the mitochondrial hydrogen shuttle to keep pace with glycolysis (Excess NADH in sarcoplasm favors conversion of pyruvic acid to lactic acid)
      2. Type of LDH - Enzyme that converts pyruvic acid to lactic acid LDH in fast-twitch fibers favors formation of lactic acid
      3. The Cori Cycle: Removal of lactate from the blood by the liver