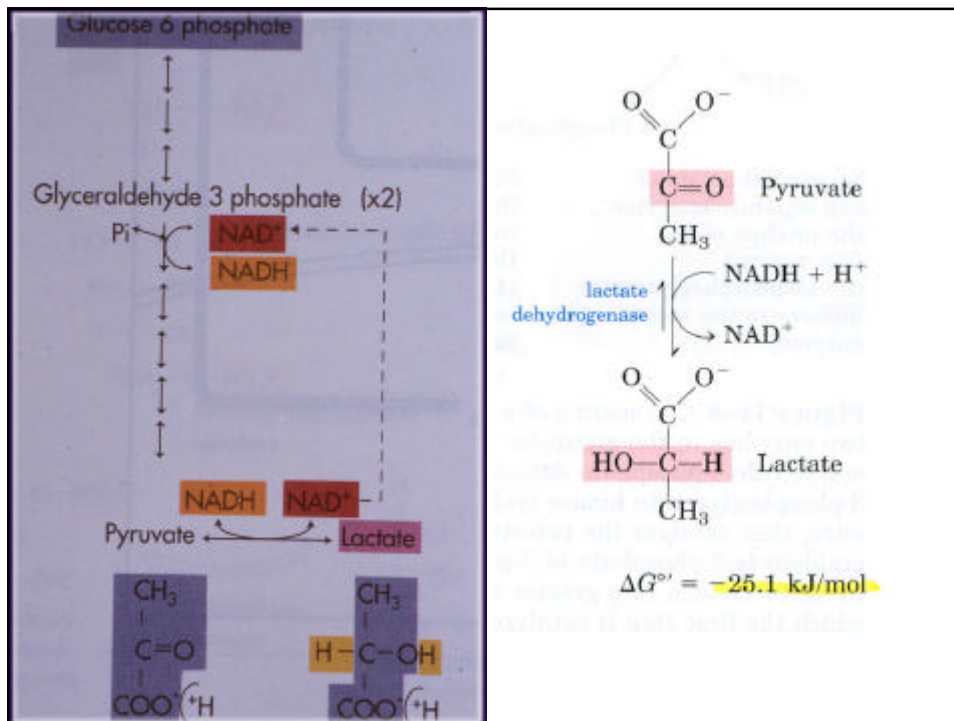
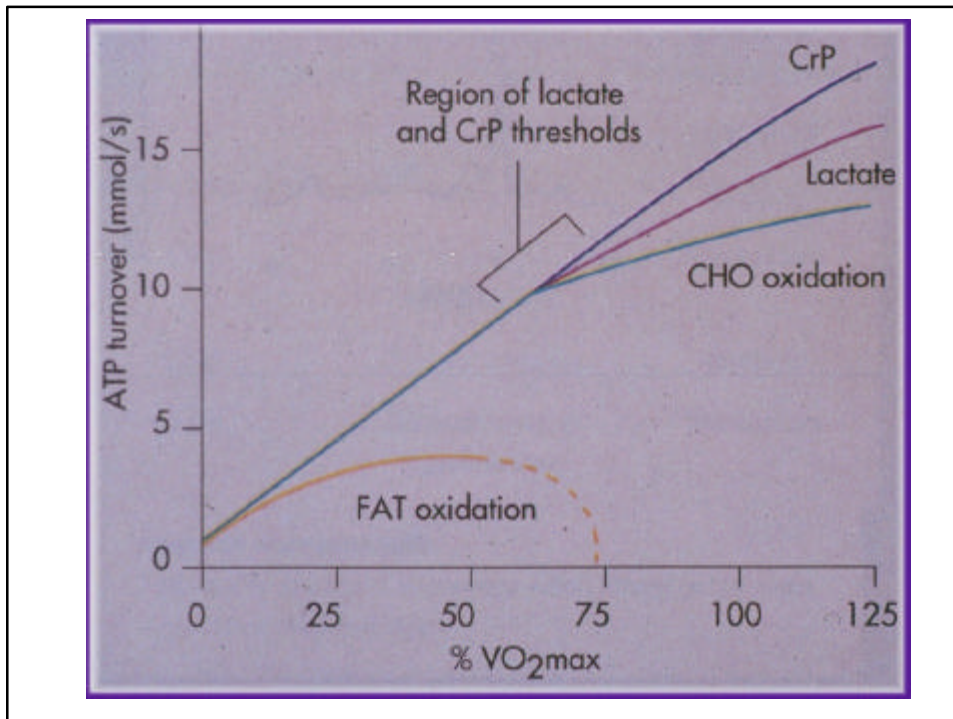
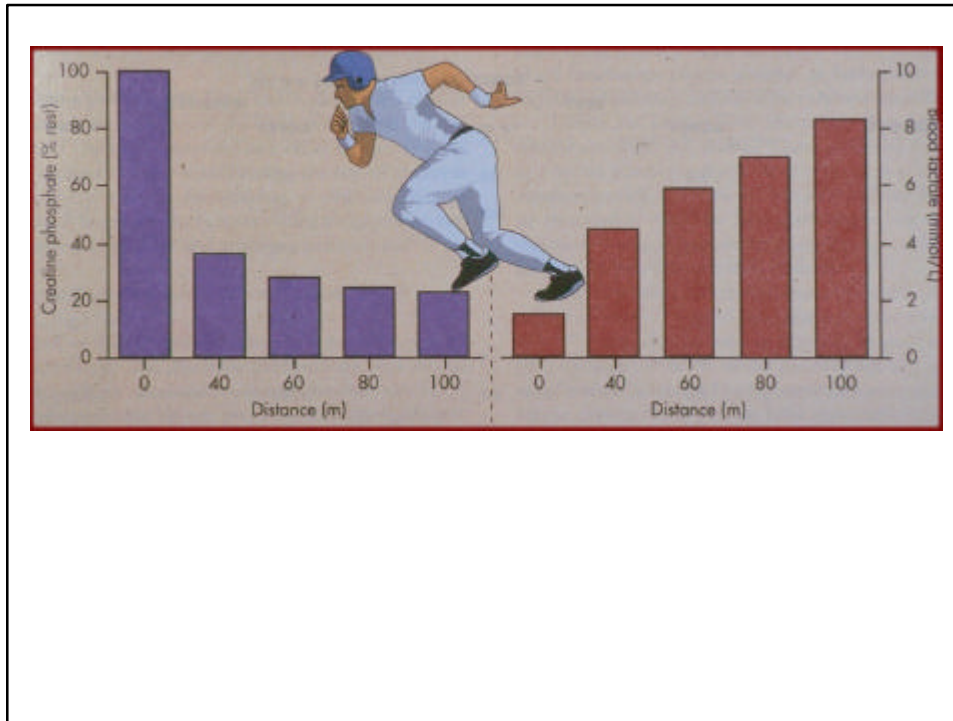


## Lactate Production and Kinetics

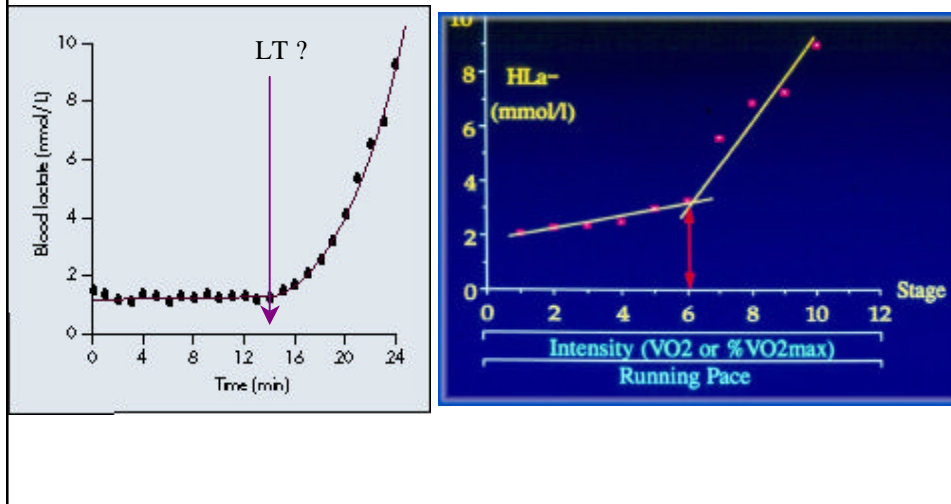


# Lactate Production and Kinetics

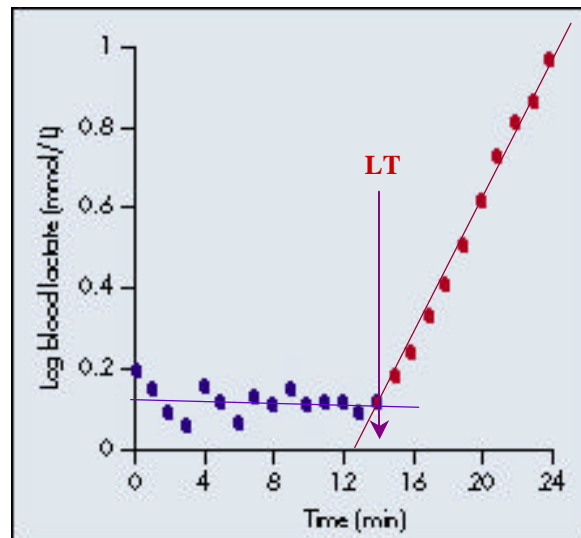


### Lactate Threshold

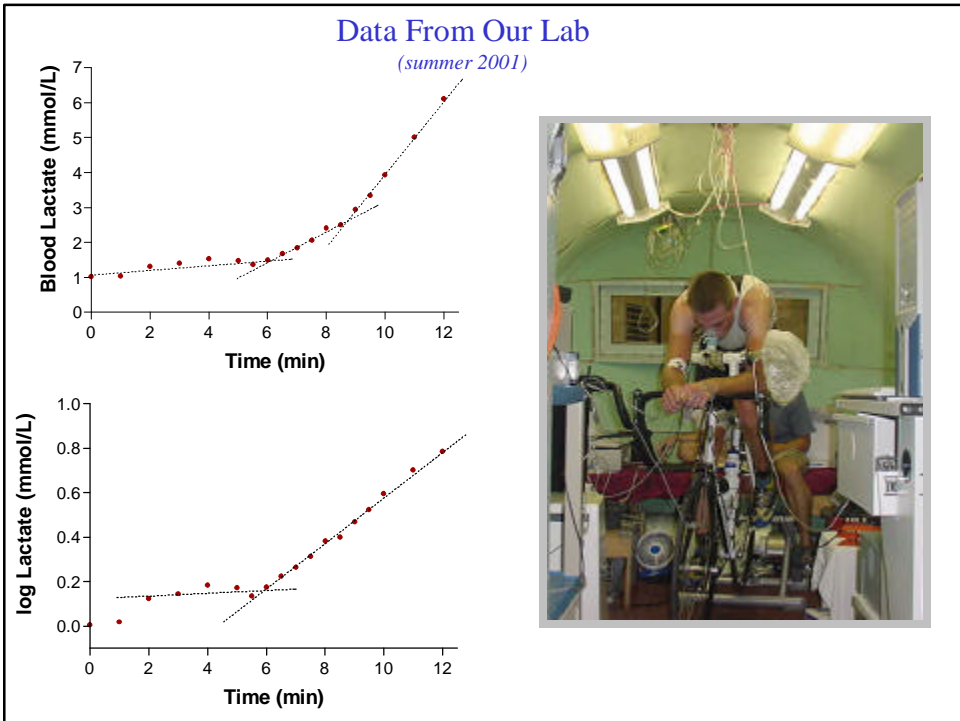
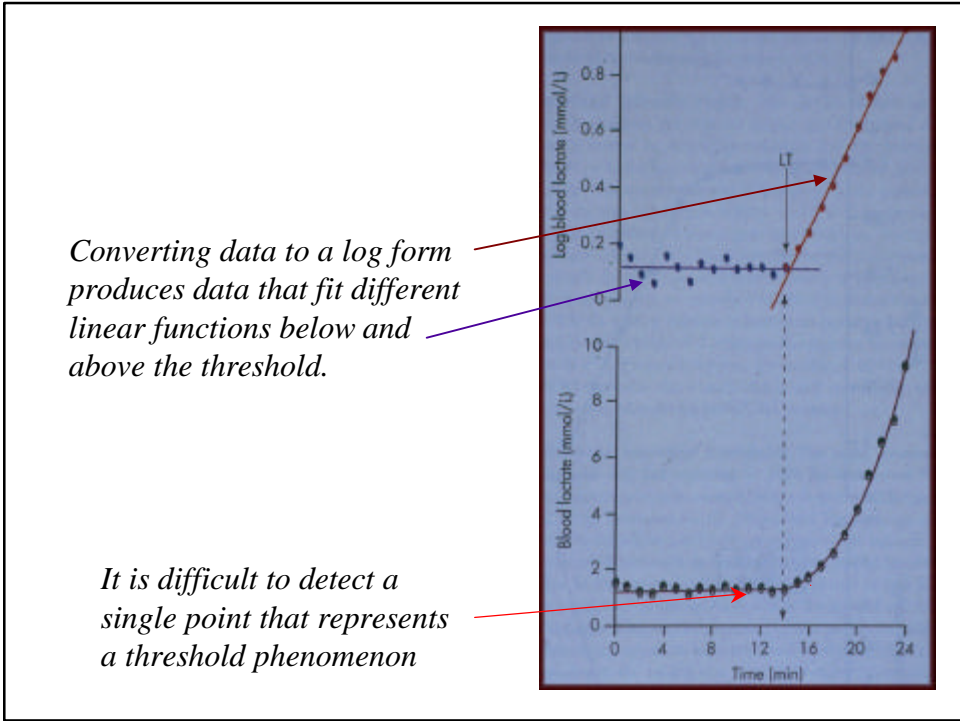
Refers to the exercise intensity where there is an abrupt increase in either of muscle or blood lactate.



To improve the detection of this threshold, researchers transform the lactate values to their  $\log_{10}$  expression.



# Lactate Production and Kinetics



### Other Lactate Threshold Terminology

**Anaerobic threshold** - first used in 1964 and based on increased blood lactate being associated with hypoxia. Now known to be an oversimplification, and should not be used.

**Onset of blood lactate accumulation (OBLA)** - the maximal steady state blood lactate concentration, which can vary between 3 to 7 mmol/L.

*Research has shown that there is considerable similarity in each of the exercise intensities obtained from the different lactate threshold methodologies.*

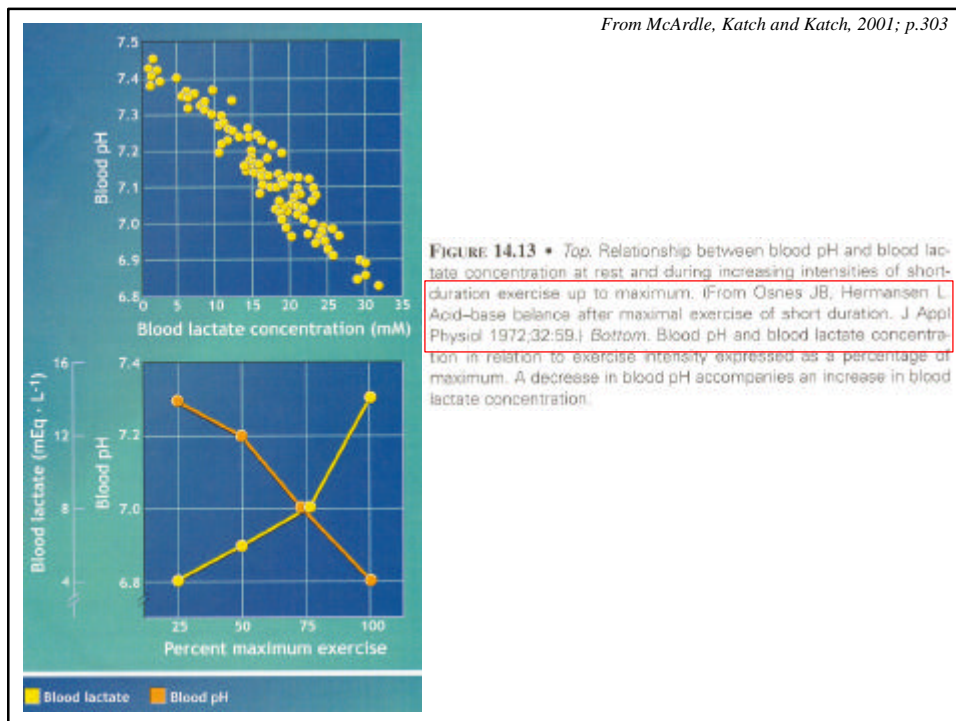
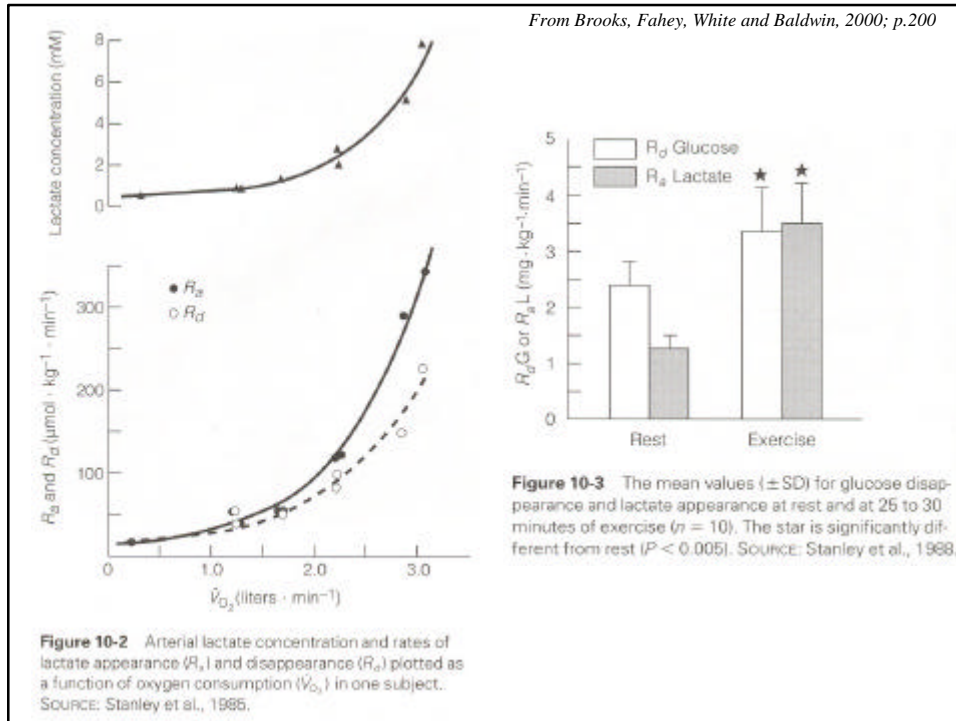
**Remember** that the limitation to exercise above the LT is not the increased blood and muscle lactate but the associated increase in acidosis and other markers of muscle fatigue.

### What causes the LT?

- ? Production of lactate
- ? Removal of lactate
- ? Fast twitch motor unit recruitment
- ? Imbalance between glycolysis and mitochondrial respiration
- ? Ischemia
- ? Muscle hypoxia
- ? Redox potential ( $\text{NAD}^+ / \text{NADH}$ ) ←

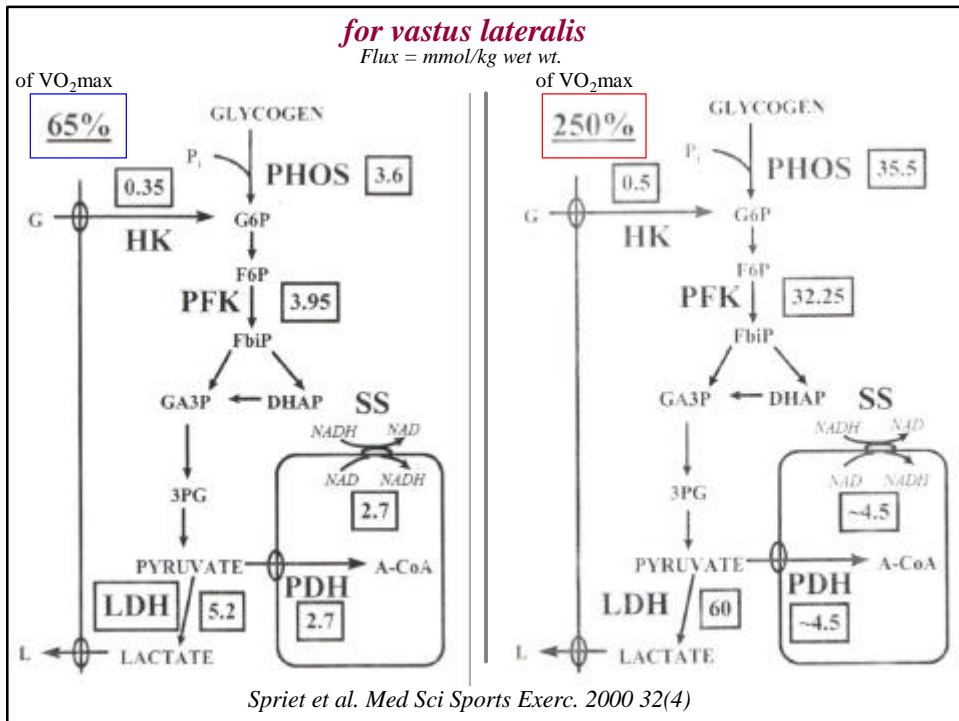
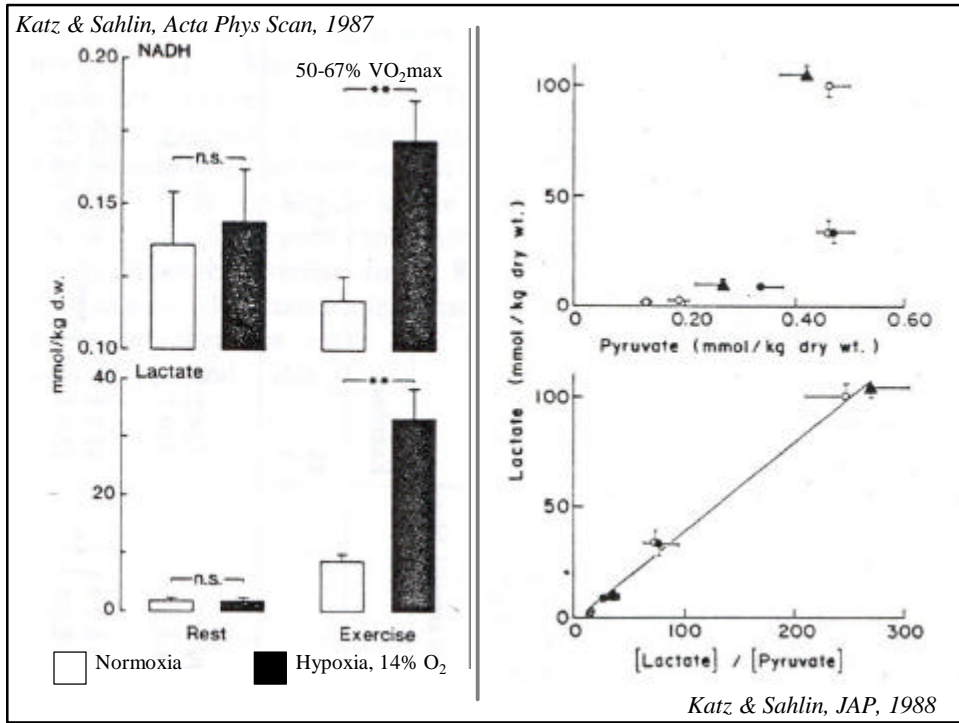


# Lactate Production and Kinetics



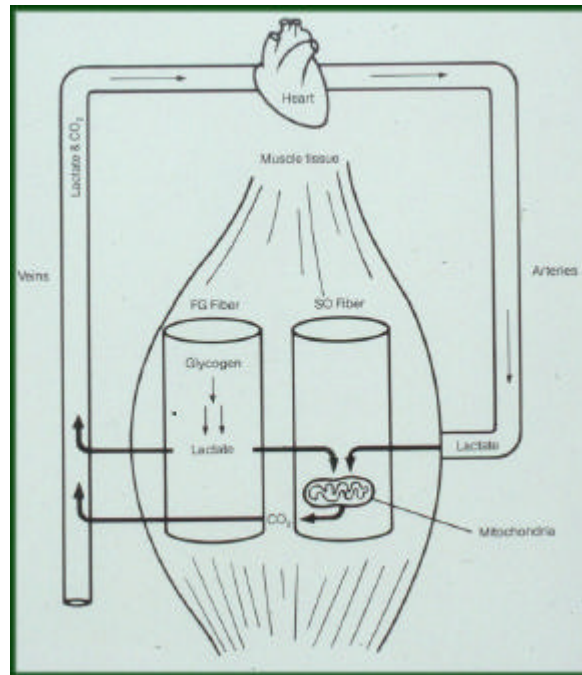


# Lactate Production and Kinetics



*Lactate is not a dead-end product of catabolism*

*Lactate can be consumed by less active muscle, or active slow twitch muscle, as well as be a gluconeogenic precursor for liver gluconeogenesis- (Cori Cycle)*

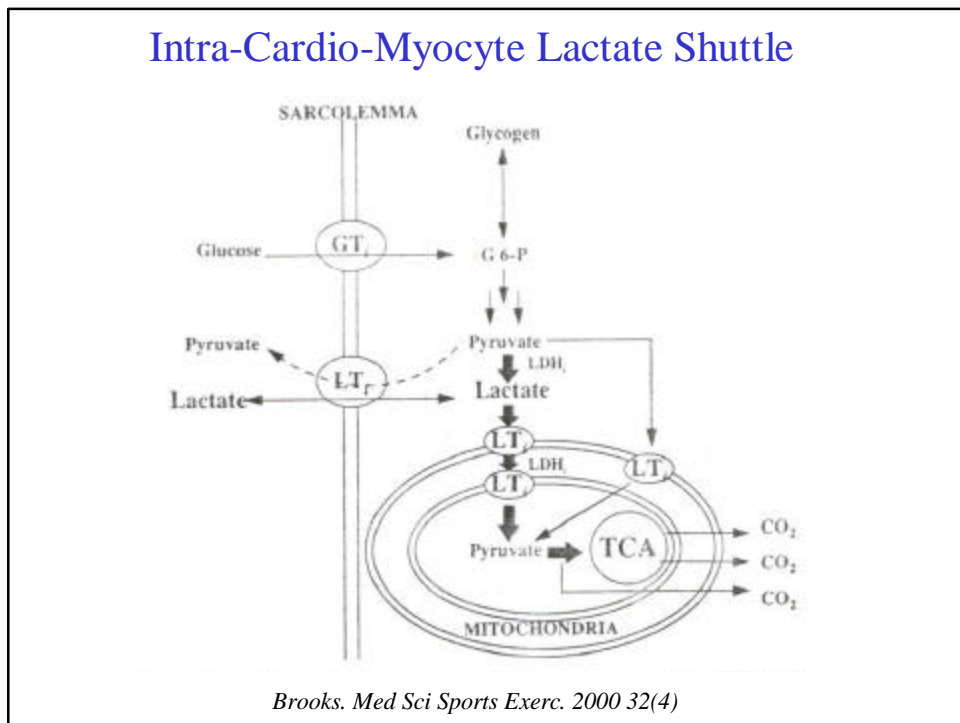
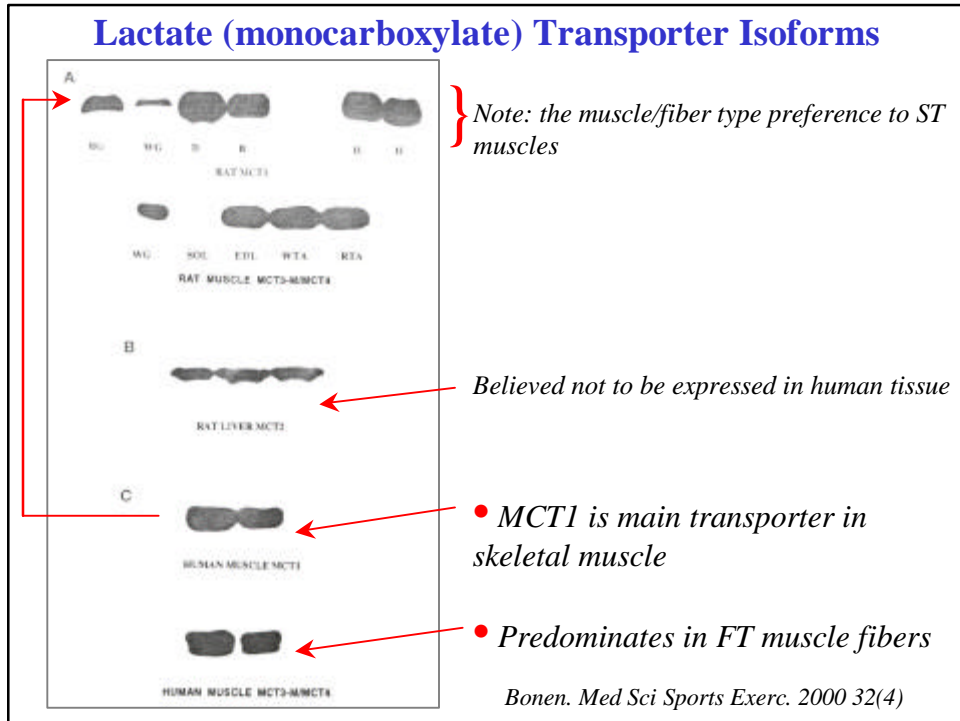


### Lactate Transporters

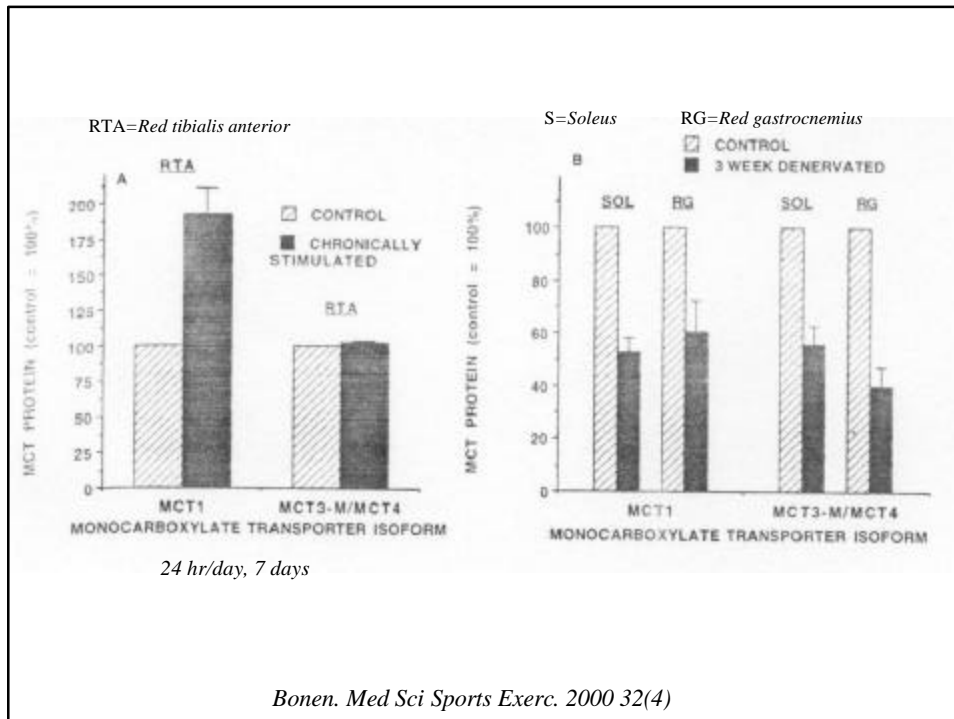
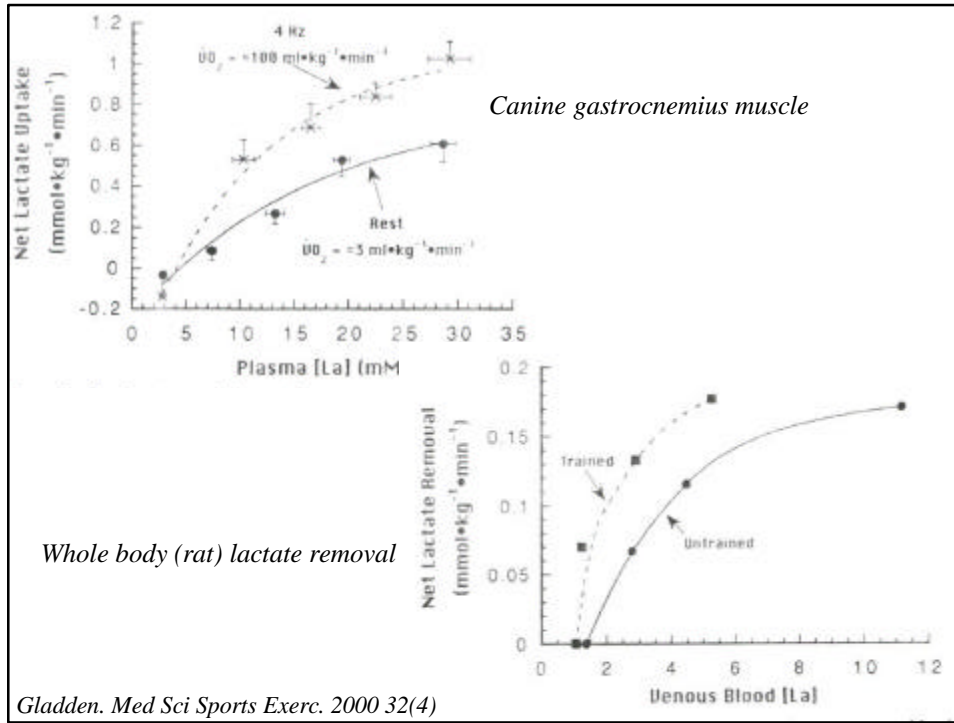
- Lactate leaves most tissues by an ATP-dependent facilitated transport system
- Both a lactate and proton are transported - lactate-proton symport
- The transporter is bi-directional
- The transporter is stereo-specific for L-lactate
- The transport process is saturable
- The transport process capacity is modified with training and inactivity
- The transport process capacity is modified with training and inactivity
- Some transporters function with other molecules (eg. pyruvate)

*Bonen. Med Sci Sports Exerc. 2000 32(4)*

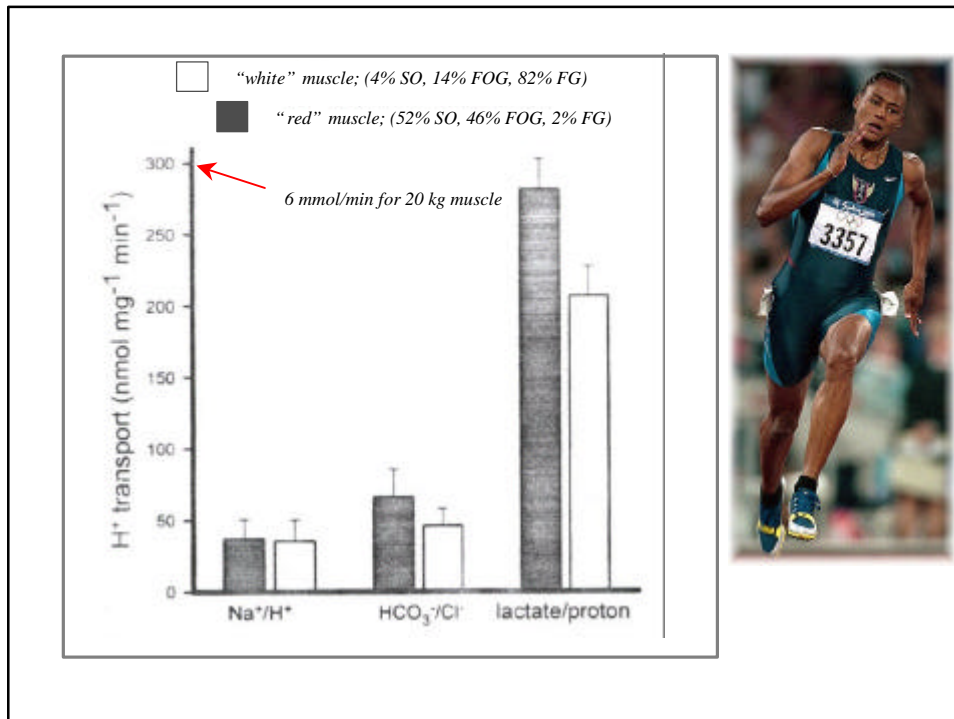
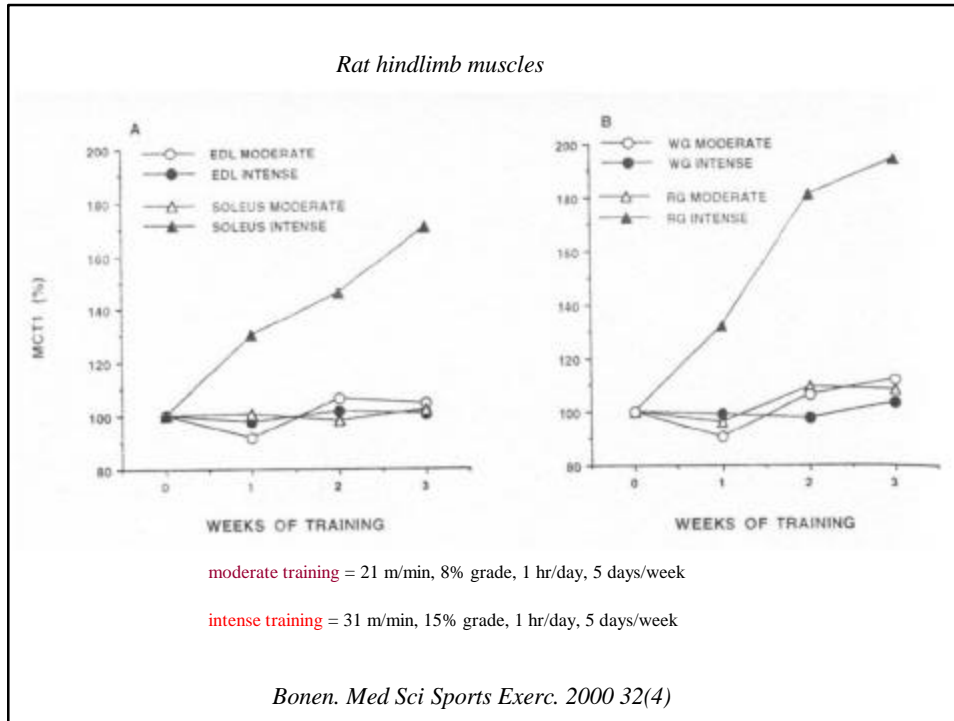




# Lactate Production and Kinetics



# Lactate Production and Kinetics



# Lactate Production and Kinetics

