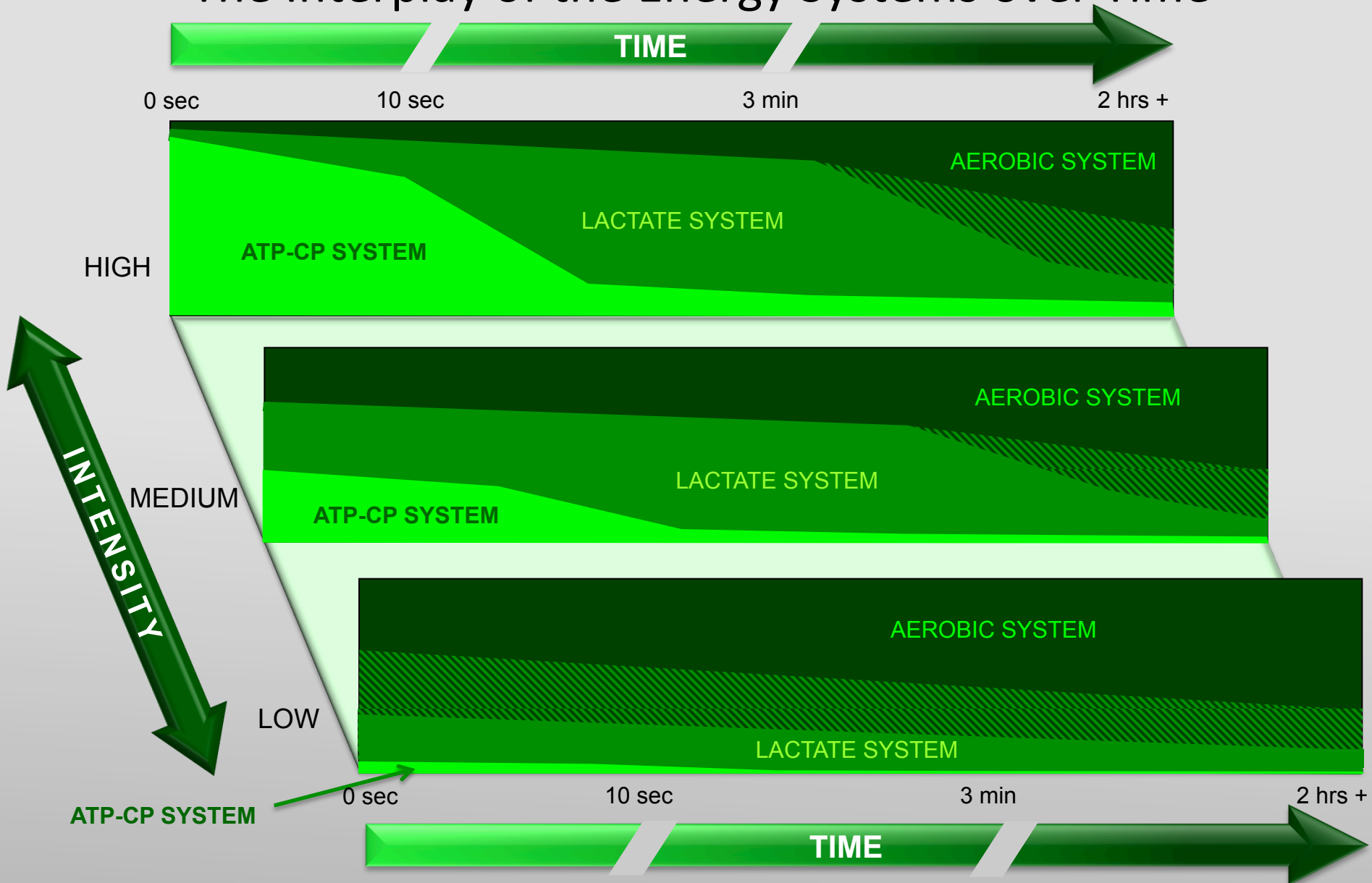
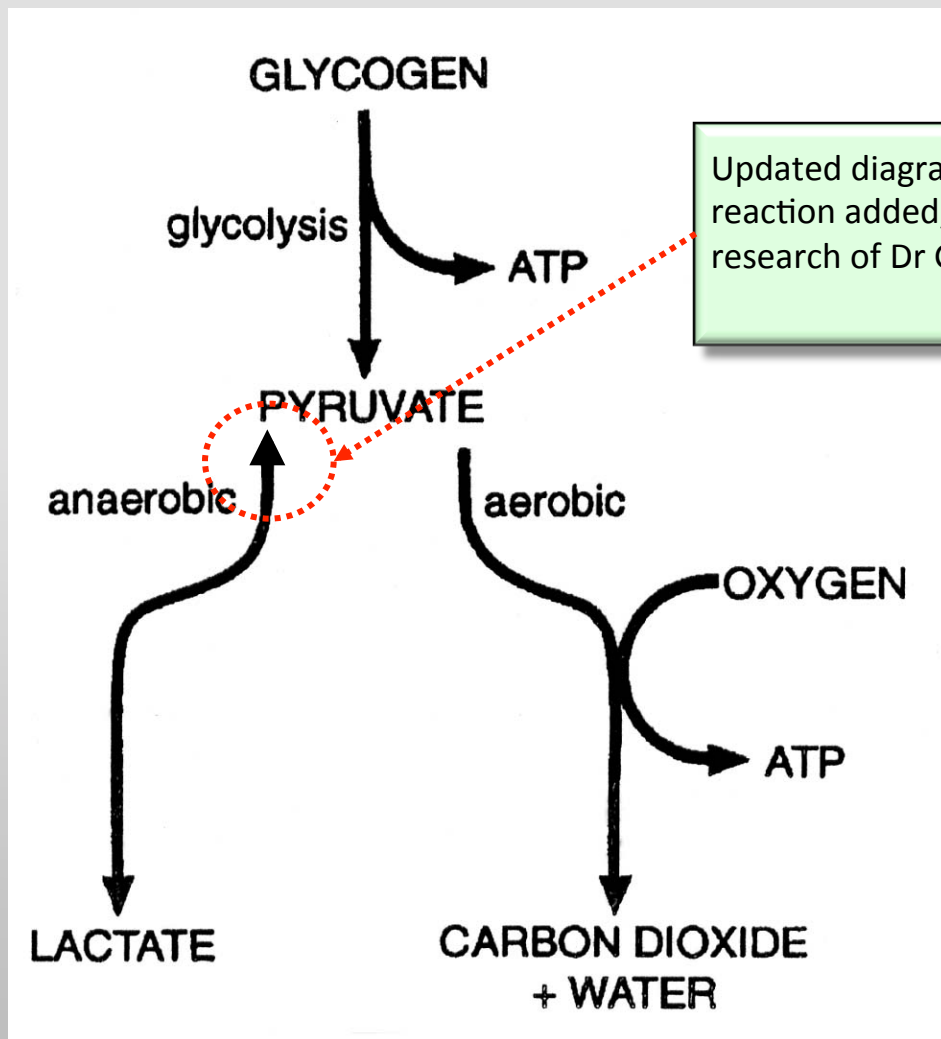


The Interplay of the Energy Systems over Time



Lactate System producing lactate to utilise as preferred Aerobic System fuel

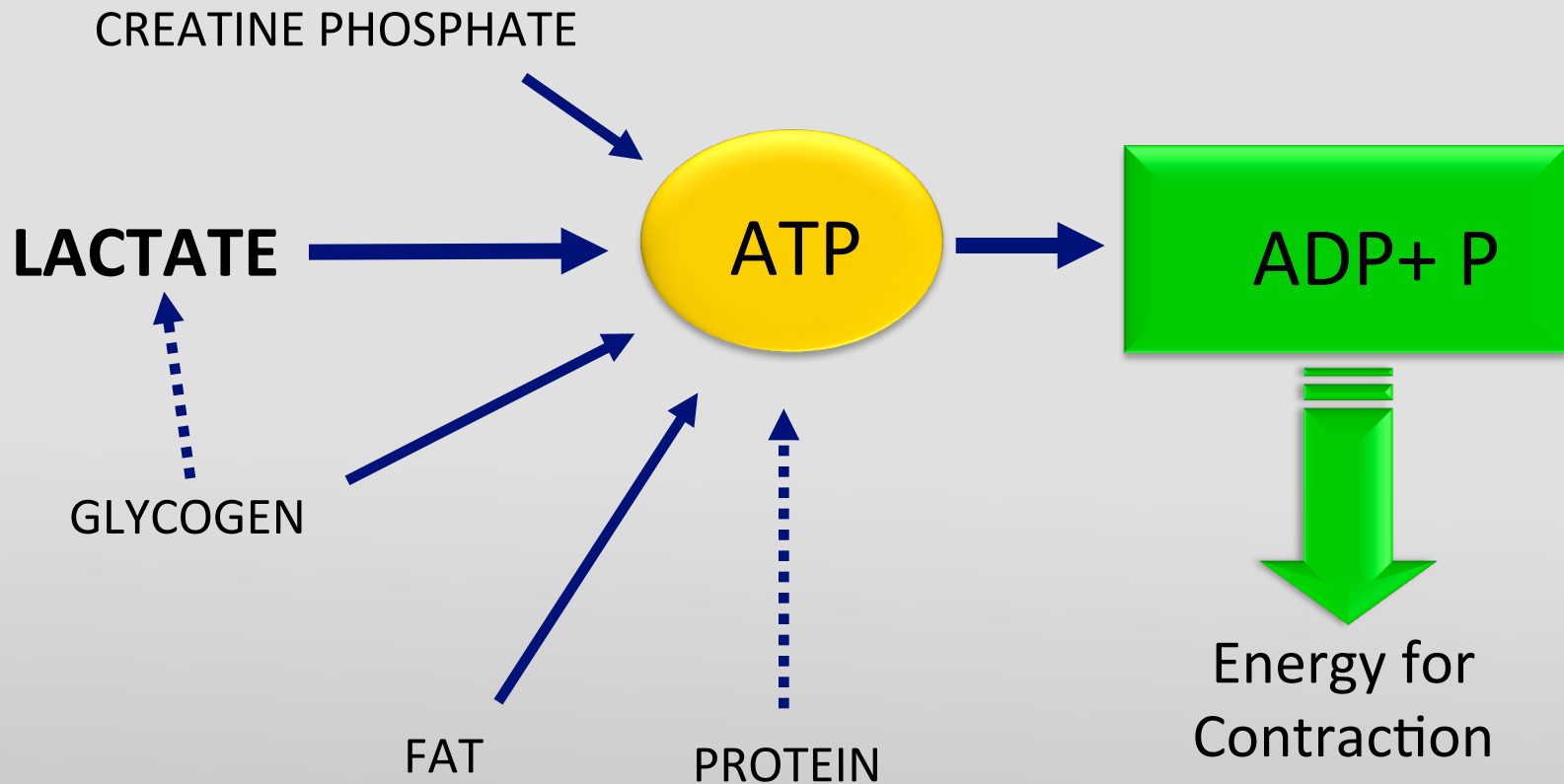
Glycolysis – Anaerobic and Aerobic



Updated diagram with reversible reaction added, according to research of Dr George A. Brooks.
P.J.L. Thompson 1994

Newsholme EA, T Leech & G Dueter 1994

Fuel Sources for ATP Production

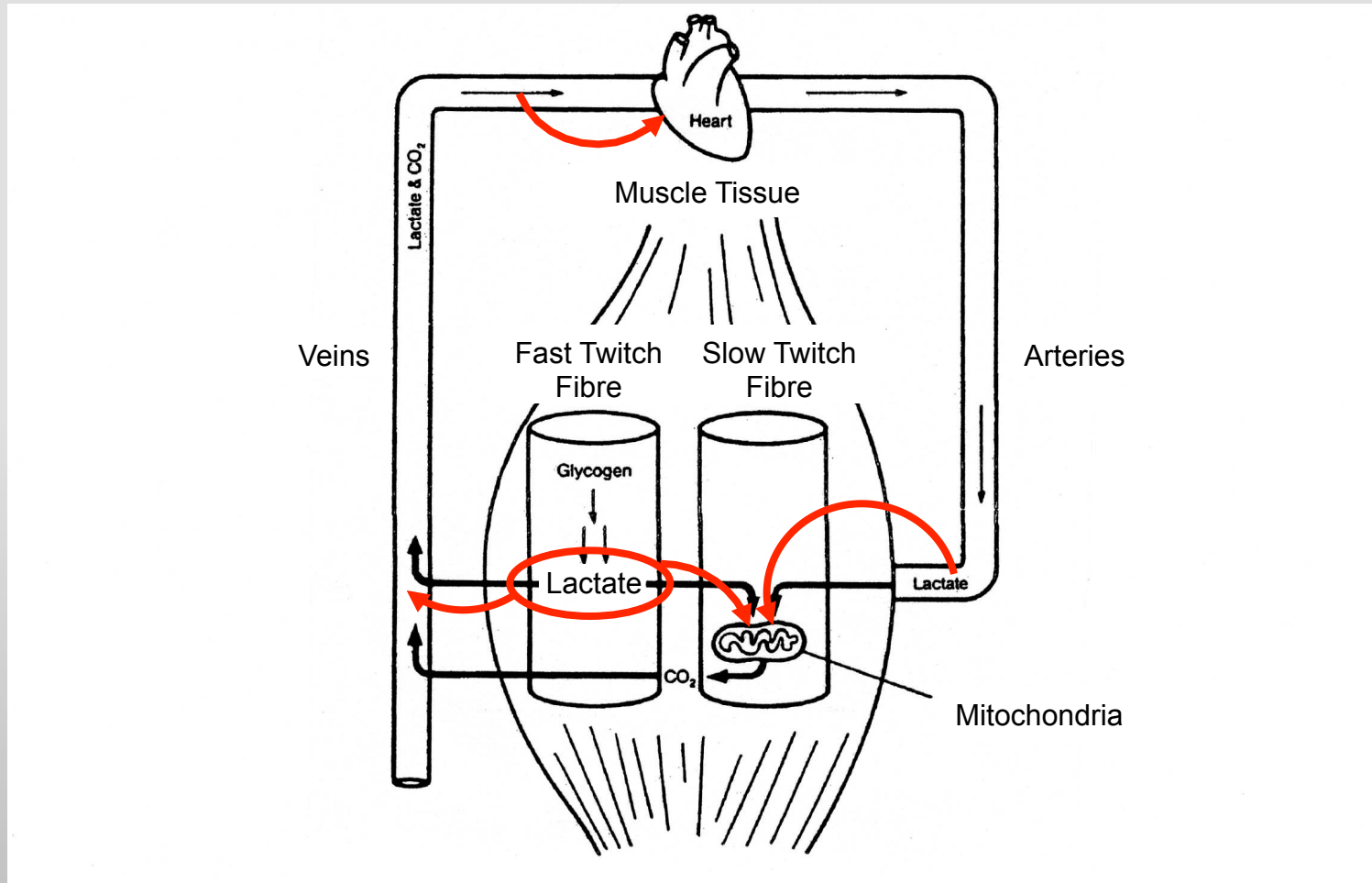


“Lactate is now recognised for its important metabolic functions and is a key substance used to provide energy, produce blood glucose and liver glycogen and promote survival in stressful situations.

Oxidation of lactate is one of our most important energy sources. In highly oxidative muscle fibres, lactate is the preferred fuel source.”

Brooks GA 1988

The Lactate Shuttle



Lactate formed in active Type IIb muscle fibres can reach adjacent Type I fibres where it is a preferred fuel and can be oxidised in the mitochondria to carbon dioxide and water. Alternately, lactate from Type IIb fibres can reach muscle capillaries and then go into the systemic circulation.

Brooks GA 1988

Blood Lactate Levels

- Blood lactate levels are only a measure of lactate accumulation – not lactate production
- Lactate is constantly being added to the blood and at the same time being removed



$$\begin{array}{r} \text{Lactate 'spilling' into the blood} \\ \text{minus} \quad \text{Lactate removed from blood} \\ \hline \text{equals} \quad \text{Lactate levels in the blood} \\ \hline \end{array}$$