

Food fuels and the three energy systems

Food fuels

We consume food to provide us with energy to keep going and to refuel our three energy systems.

Our food intake consists of three basic nutrients:

- 1.
- 2.
- 3.

Carbohydrates

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List some food sources of carbohydrates, for example bread.

Fats

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List some food sources of fats, for example butter.

Protein

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List some food sources of protein, for example fish.

Major food types, sources and fuel conversions

table
5.1

Major food types, sources and fuel conversions

Food fuel	Recommended daily intake (RDI) for a balanced diet (%)	Food fuel after conversion/digestion	Storage
Carbohydrates		Glucose	
Fats (triglycerides)		Free fatty acids (FFAs)	
Protein		Amino acids	

(pg. 117)

Foods as energy sources

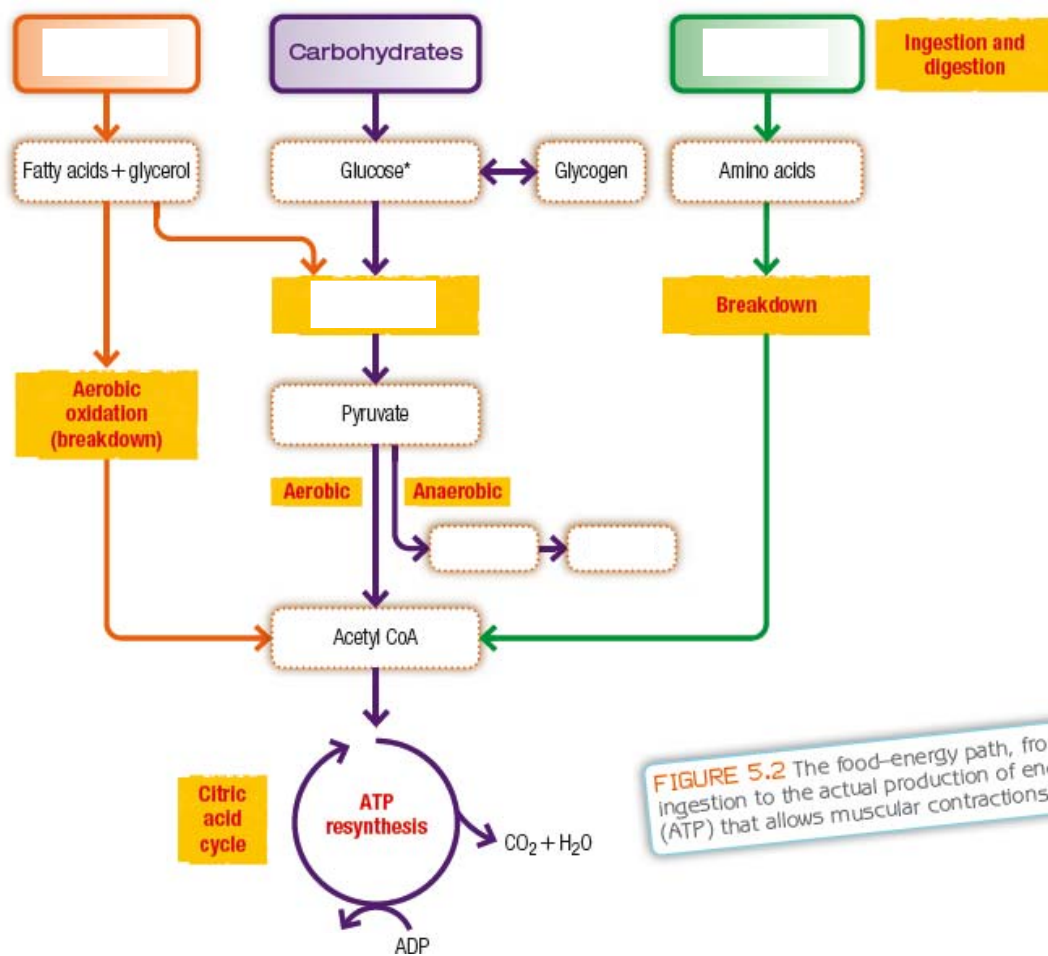


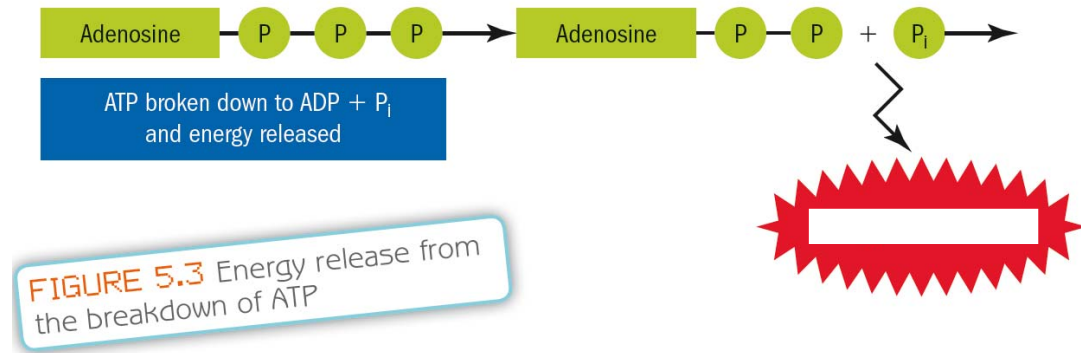
FIGURE 5.2 The food-energy path, from ingestion to the actual production of energy (ATP) that allows muscular contractions

ATP

- **Adenosine triphosphate (ATP)** is a major source of energy that keeps every cell in the body going, including muscles.

What is ATP?

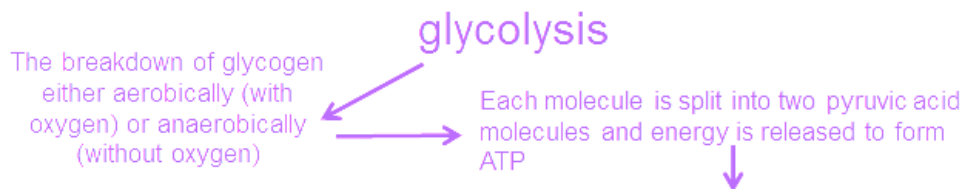
ATP = Energy



Fuel Sources for physical activity

Glycogen is the body's preferred energy source in exercise

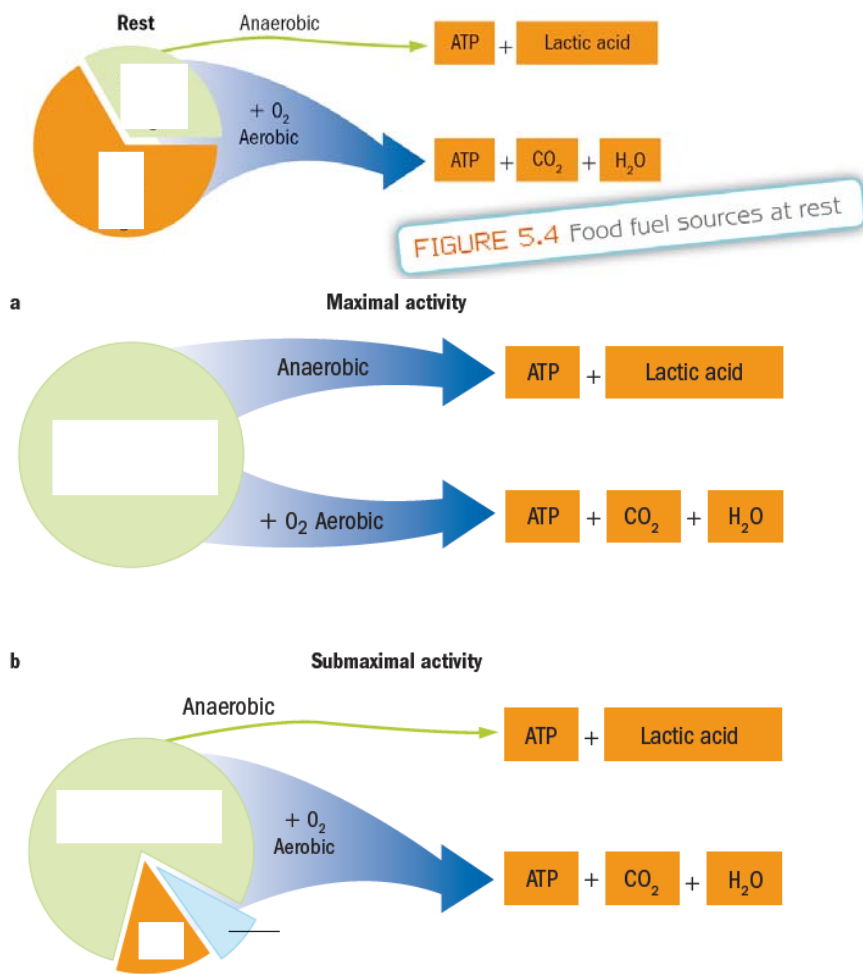
Energy is produced by glycogen via



Anaerobic glycolysis:

Aerobic glycolysis:

Food Fuel Sources at rest, maximal and submaximal activity:



Food Fuels and Energy Production:

Carbohydrates

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- Prolonged endurance events require carbohydrate loading

What is Carbohydrate loading?

- Anaerobic exercise - CHO is primary source once PC stores are depleted

Fats

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- Fats are stored in the form of triglycerides, can be broken down into FFA, which can be broken down aerobically to provide energy
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Protein

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Carbohydrates- fat 'fuel mixture'

As intensity drops from maximal and the duration increases there is an increase in reliance on fats

Prolonged exercise e.g. marathon

- Early stages predominantly use glycogen as a fuel source, however fats are the preferred fuel source under these conditions
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Fats as a fuel source

Aerobic training tends to increase the ability to use fatty acids for ATP resynthesis by increasing the number of mitochondria they develop, and glycogen sparing

What is Glycogen sparing?