Metabolism in a Nutshell

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Glycolysis

2 ATP are used to add a phosphate to glucose
This 'phosphorylated' molecule is split in several reactions ---> 4 ATP + 2 pyruvic acid
(net gain of 2 ATP)

Pyruvic acid from above converted into acetyl-CoA, a form of acetic acid.
Acetyl CoA enters Krebs/citric acid cycle ---> 2 ATP + CO_2 and H^+

Hydrogen ions above are further oxidized in an electron transfer process called oxidative phosphorylation.
1 glucose ---> 32 ATP through oxidative phosphorylation.
If oxygen isn't available (as in high intensity work), lactic acid is formed.
The lactic acid diffuses into the blood until oxygen is available again.

Fatty Acid and Glycerol Metabolism

Glycerol can enter anaerobic glycolytic reactions ---> pyruvic acid
Complete glycerol breakdown ---> 22 ATP
Glycerol can also provide the carbon skeleton for glucose synthesis when
carbohydrate is restrected in the diet or during long-term exercise straining glycogen reserves.

Fatty acids oxidize into acetyl-CoA, which can enter Krebs if sufficient
oxaloacetic acid generated from carbohydrate metabolism is available.
Fatty acid breakdown is directly associated with oxygen uptake.
1 FA ---> 147 ATP and 1 triglyceride contains 3 fatty acids, so...
One neutral fat molecule:
441 ATP from Krebs + 22 ATP from glycerol catabolism ---> 465 total ATP

Protein.

Amino acids are first deaminated (nitrogen is removed)
and converted into a form that can readily enter the energy pathways.
These residues enter the Krebs cycle at various intermediate stages.

Macronutrient usage as energy substrates depends upon:

Level of Activity

Moderate to intense activity ---> growth hormone secretion.
GH stimulates FFA release and protein synthesis ---> FA's available for energy production, proteins not.

Psychological and Health Status; Nutritional State; Endocrine Status (influenced by previous factors)
Blood glucose levels control insulin and glucagon secretion:
High glucose -> insulin release -> inhibit fa release, enhance glucose usage
Low glucose -> glucagon release -> enhance glycogenolysis and gluconeogenesis, inhibit glucose use
Emotional or Physical Distress ---> cortisol release ---> ffa release ---> fa usage increase