

# HOW TO MAKE AN ELECTRIC BATTERY

ATP is a high-energy phosphate compound which provides the cell with all the energy it needs to carry on its work. What is more, the cell manufactures the ATP out of raw materials. This ATP is then stored in tiny bean-shaped structures within the cell, called mitochondria.

If the cell can do it, why can't we do it also? ATP would solve all our energy problems. Look below at what your body "by merest chance" does in order to manufacture ATP.

It's all very simple:

"The chloroplast [in the leaf] contains not only chlorophyll but a full complement of enzymes and associated substances, all properly and intricately arranged. It even contains cytochromes by which the energy of sunlight, trapped by chlorophyll, can be converted into ATP through oxidative phosphorylation . . .

"After the water molecules have been split, half of the hydrogen atoms find their way into the ribulose-diphosphate cycle, and half of the oxygen atoms are liberated into the air. The rest of the hydrogens and oxygens recombine into water. In doing so, they release the excess of energy that was given to them when sunlight split the water molecules, and this energy is transferred to high-energy phosphate compounds such as ATP. The energy stored in these compounds is then used to power the ribulose-diphosphate cycle."—*Isaac Asimov, Asimov's New Guide to Science (1984), pp. 591, 594.*

As you will notice in the chart below, in eleven steps ATP is made. Twice in those steps it is formed (two molecules formed at step 7 and two at step 10). Since two molecules of ATP are used to prime the entire process (step 1) initiating the breakdown of glucose, a net gain of only two molecules results from the entire eleven-step process of breaking down glucose pyruvate. All the steps must be completed in order to produce additional ATP. How long did the cells within living creatures wait till the randomness of "natural selection" devised the following utterly complicated formula:

