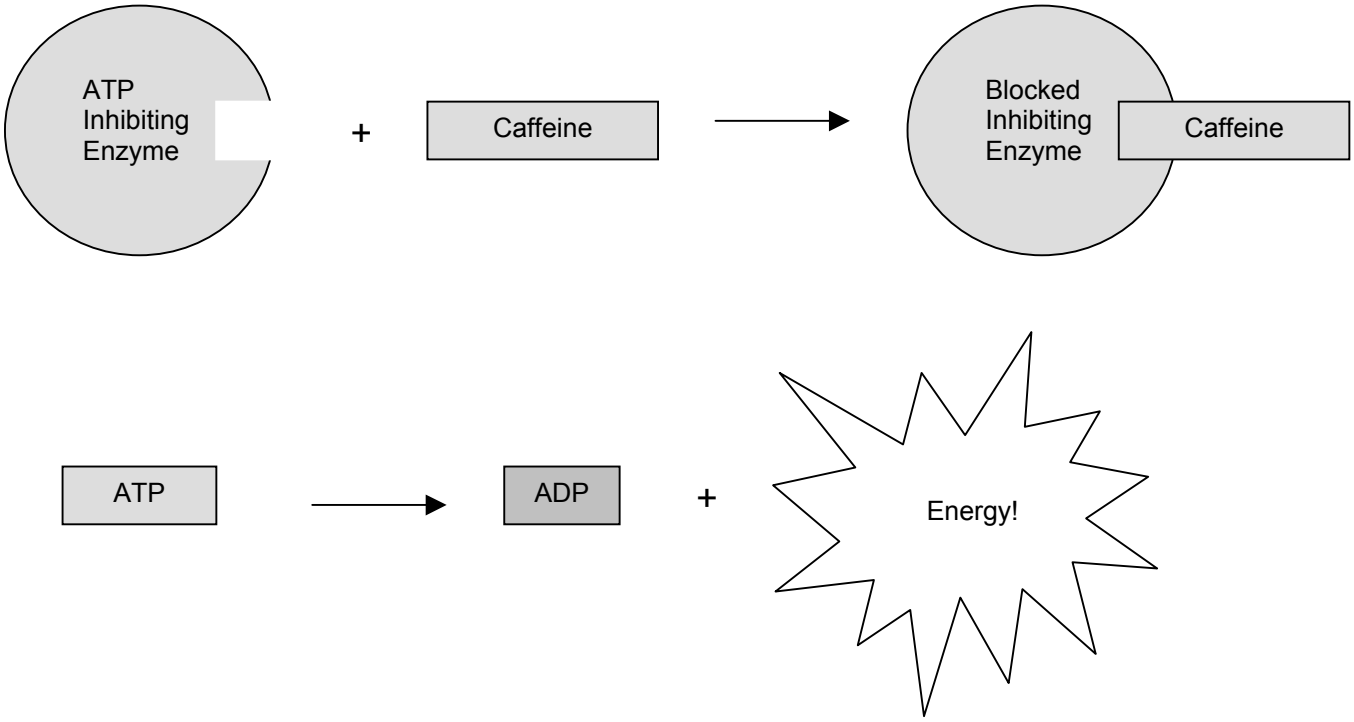
Caffeine is known as a respiratory stimulant. Hence it increases the rate of respiration and temporarily gives the body more energy. How does it work? Well it is all rather cunning. As any biochemists out there will know, the body's 'energy molecule' is called ATP (adenosine tri-phosphate you will recall). Breakdown of ATP to its relative ADP releases energy and that is what respiration is all about. However, there is an enzyme, this time called *phospho-diesterase*, which binds with the ATP and prevents its breakdown – hence storing its energy.



The caffeine molecule mimics the shape of ATP and binds to this enzyme, so preventing the inhibition of the ATP and allowing the release of extra energy.

Antibacterials

In our syllabus we are only concerned with penicillins (which is a pity really as there is so much more to the subject). They were not the first drugs taken to cure bacterial infections, but they were the first naturally occurring ones. Penicillins are a wide class of similar molecules, the first of which were found in moulds. Why should moulds produce these molecules? The obvious answer is to kill off local bacteria and reduce the competition for food from other species in their own 'patch'.

The story starts, as I guess everyone knows, in 1928, in a room at St Mary's Hospital, University of London where a young Scot, Alexander Fleming, was doing research on bacteria. One morning he noticed that some of the bacterial colonies he had been growing had died off where something had blown onto his petri dish. That 'something', which might have come in through an open window, was penicillin. Fleming's achievement was not to ignore his apparent setback, but to set out to identify what had killed the bacteria. However he was not able to isolate the penicillin in sufficient amounts to do meaningful experiments. That was not done until 1940, when Howard Florey and Ernst Chain, working at Oxford University, managed to purify the drug and allow it to be used clinically, just in time for much of WW II. All three received the Nobel Prize in 1945.