Caffeine and it’s effects on the human body

Caffeine (thein) is a non-smelling, bitter tasting, crystalline substance and is naturally found in the coffee bean, black tea, mate tea and in fewer amounts in the coffee bean. It is a xanthine and one of the most important alkaloids. It acts as a psychostimulant on the central nervous system whereby fatigue can be decreased and mental and athletic performance can be increased. In the human body the substance is metabolized by cytochrome P450 in the liver and the most important metabolites are paraxanthine, theobromine and theophylline. There are varieties in metabolizing caffeine among people depending on genetic polymorphisms, hepatic illnesses or individual properties like weight and gender.

Caffeine has diuretic effects but this does not mean that it has a negative effect on the fluid balance. It is possible to have a loss in total body water but a normal liquid status. If there is a great loss the body uses compensation mechanisms to maintain the liquid status.

It is not yet clear whether caffeine consumption (in form of coffee) can lead to a higher blood pressure and therefore represent a higher risk of coronary heart disease. Studies show different results. One important mechanism is the one with adenosine. When caffeine is taken in it is rapidly absorbed and blocks the adenosine receptors so that no adenosine can bind. This results in a stimulation of certain chemoreceptors in the plasma so that the sympathetic tone increases and there is a higher peripheral resistance. Scientists are inconclusive about the negative vascular effects.

As it acts on the central nervous system caffeine can improve athletic performance. When caffeine is taken in before doing sports it comes to a substrate utilization in the body. The reliance is on the oxidation of fatty acids in the muscle, there is a decrease of dependence on glycogen. Therefore the endurance can be increased. Another mechanism of action is the one by increasing the distribution of β-endorphines. They are responsible to decrease the sensitivity of feeling pain and that is why exercises can be done longer.

However there are many effects of caffeine but the reactions on it are very individual. It always depends on the amount of intake, the individual metabolism, age, weight and gender of a person. Thus it is difficult to make any global statements.

References


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