

Natural products – pro- and antioxidative effects

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Reactive Oxygen Species (ROS), sometimes also imprecisely referred to as ‘free radicals’, are formed within the human body and by external sources, such as environmental pollution. Inside the body, these ROS fulfill many useful functions, including important roles in host defense against microorganisms. The involvement of ROS in cellular signaling even provides a platform for novel, innovative therapeutic approaches based on redox-modulation, which embraces catalytic agents and also some pro-oxidant natural products. Nonetheless, the cell maintains a fine redox balance, and a disturbance in either direction is detrimental. Oxidative stress (OS) is a biochemical condition characterized by a significant increase of ROS levels. It often results in damage to cells, tissue and the whole organism. Not surprisingly, the human body contains a range of defense systems able to ‘neutralize’ OS. Among them, enzymes are particularly effective, since they catalyze the destruction of ROS. Since the occurrence of OS is related to various diseases, infections, inflammation and ageing, antioxidants are also becoming increasingly important. While the human body is able to synthesize some of these antioxidants, others need to be obtained via nutrition. This field of antioxidant research is still not fully understood and highly controversial. Nonetheless, there are some promising agents, such as carotenoids, flavonoids, anthocyanidins and proanthocyanidins, which fulfill various roles in the context of antioxidant activity, cell differentiation and possibly disease prevention. More research needs to be conducted in order to address the various activities related to these compounds, especially in the context of an ageing population with a need for an appropriate, redox-balanced diet.