COGNITION ENHANCERS BETWEEN TREATING AND DOPING THE MIND

Memory, attention and creativity represent three different cognitive domains, which are interconnected and contribute the “mental performance” of an individual. Modern neuroscience has investigated some of the neuronal circuits and of the neurotransmitters and molecular events underlying the above-mentioned cognitive functions. Within this renewed reference context, some of the properties of the components of the remedies to increase mental performance have been studied and validated in experimental models and, to date, these substances are named “smart drugs”, “memory enhancing drugs” or “nootropic drugs” (from the Greek root *noos* for mind and *tropein* for toward). Recently pharmaceutical industries are increasingly focusing on the research for potential substances in this field: several “smart drugs” are in clinical trials and could be on the market in few years. Furthermore, a quick survey from Internet highlights the presence of a great variety of both approved and non-approved drugs, with some of them addressing to only medical and others to performance-oriented use, opening room to some reflections or speculations from scientific and ethical points of view.

In order to point out the effect of nootropic drugs on cognition of healthy people, we reviewed the literature on drug enhancement of various cognitive functions, including memory, attention and creativity. As their simplest, memory is regarded as the ability to remember events or learned material, attention is the cognitive process of selectively concentrating on one aspect while ignoring distracters and creativity could be described as the ability to create products or ideas which are original and which possess a social usefulness.

Reports from literature reveal that some medications currently available to patients with memory disorders may also increase performances in healthy people and that drugs designed for psychiatric disorders can also be used to enhance certain mental functions. However, the long-term effects of these drugs are unknown, but their apparent effectiveness allows room to their use and misuse. At variance with these literature data showing scientific, even if poor, evidence of the effect of smart drugs in the field of memory and attention, only indirect information on creativity can be obtained by studies of the effects of diseases and drugs on the artistic productivity of classic painters and famous authors, offering a link to understand the neuronal basis of this cognitive function and a cue to understand how drugs (used to correct the illness) may affect the function.

On the basis of these cues, in this review we will discuss some critical aspects of the different cerebral circuits and molecular events regulating memory, attention and creativity in order to outline the neurobiological bases of the effects of “smart drugs” on cognitive functions, and to evaluate their putative pharmaceutical development.

Cristina Lanni, Silvia C. Lenzken, Alessia Pascale, Igor Del Vecchio, Marco Racchi, Francesca Pistoia and Stefano Govoni; "Cognition enhancers between treating and doping the mind"; Pharmacological Research 57 (2008) 196–213; http://dx.doi.org/10.1016/j.phrs.2008.02.004.