

## **The role of micronutrients in brain homeostasis**

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The brain is influenced by substances present in the diet (as essential fatty acids, including omega-3 polyunsaturated fatty acids, but also essential amino-acids, vitamins and minerals). It has been postulated that food can have an impact on brain structure and functioning. Actually, most micronutrients (trace-elements or vitamins) have been directly linked to the setting of cerebral functions. For example, some micro-elements, as vitamin B1, that controls cognitive performances, especially in the elderly, it has been demonstrated being implicated the use of glucose by nervous tissue. So as vitamins B6 and B12, among others, are involved in the synthesis of some neurotransmitters. It has been also demonstrated that nerve endings contain the highest concentrations of vitamin C in the human body, demonstrating the fundamental importance of this essential vitamin. It has been proposed that vitamin D could be of interest in preventing neurodegenerative or neuroimmune diseases and vitamin E (tocopherols and tocotrienols), in particular alpha-tocopherol is actively up taken by brain and directly implicated in nervous membranes protection. Vitamin K has also been shown to be implicated in brain biochemistry. Even trace-elements play an important role in brain. In fact, magnesium has been demonstrated to have an important role in ionic and oxidation-reduction regulation. Moreover, an impaired copper metabolism homeostasis has been linked to Alzheimer disease, while iodine has been linked to energy metabolism of the cerebral cells. Moreover, it has been largely proved that manganese, copper, and zinc play a pivotal role in enzymatic protection mechanisms against reactive oxygen species. So, food nutrient composition can have either immediate or long-term effects, positive or negative. It has been postulated that brain diseases during aging can also be due to dietary deficiencies in anti-oxidants and nutrients (non-essential micronutrients such as polyphenols or trace elements and vitamins) and therefore lead to failure for protective mechanism, for example related with protection against free radicals.

## **Biography**

Gaia Rocchitta has completed her graduation in chemistry in 1999 with a thesis about polyphenols in red wines, then she completed her PhD in Neuroscience at School of Medicine of Sassari University (Italy) in 2004. She was a Postdoctoral fellow at School of Chemistry and Chemical Biology, University College, Dublin (Ireland) in 2006, working on the development of amperometric biosensors for in vivo monitoring of neurochemical compounds. She currently is a tenured researcher and lecturer in Pharmacology and Nutraceutical at School of Medicine of Sassari University (Italy). Dr Rocchitta has been a tutor for numerous PhD projects mainly focused on the development of analytical devices for the monitoring of neurochemicals in vivo, but also of nutraceuticals in agri-food matrices. Moreover, she has published about 60 papers in peer-reviewed journals of international relevance.