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Unraveling the role of the cerebellum in drug addiction: Old and recent ideas with a new support

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Addictive drugs compete with natural reinforces for neural plasticity mechanisms, reducing progressively the ability of those to maintain adapted behavior. Drug-induced neural plasticity mechanisms in prefronto-limbic-striatal circuitry have been proposed as responsible for the instauration and maintenance of addictive behavior. We propose that drug-induced plasticity in prefronto-cerebellar circuitry will be a central stage of behavioral modifications leading to addictive behavior. The reasoning that supports the current proposal is based on the follow premises and results: 1) the cerebellum is crucial for consolidation and long-term storage of pavlovian and instrumental memory; 2) the cerebellum connects with fronto-limbic-striatal circuitry; 3) addictive drugs alter cerebellar plasticity mechanisms; 4) we observed that a short experience with cocaine produced a robust c-Fos expression in the mouse medial prefrontal cortex. However, after prolonging cocaine experience, the cerebellum showed higher c-Fos expression than the prefrontal cortex. It is also important to study how environmental factors can protect the brain against drug effects. Recently, we focus on the possibility of extending cerebellar proliferative activity beyond the postnatal period by exposing mice to environmental enrichment. Our findings showed that an enriched environment increases the presence of newly generated neurons at the granular layer of the cerebellar cortex. Moreover, environmental enrichment maintained neurogenic activity in the cerebellum of those animals chronically treated with alcohol and cocaine. These results supports ways in which the cerebellum may be challenged and stimulated, making it possible to develop environmental therapeutic strategies to ameliorate the consequences of drug abuse.

Biography

Marta Miquel has completed her Ph.D at the age of 29 years from University of Valencia and postdoctoral studies from the Department of Pharmacology, University of Toronto and C.I.F.A (Faculty of Medicine), University of Navarra. Spain. Currently, she is tenure awarded professor in Psychobiology in the Faculty of Health Sciences. Jaume I University, (Spain) and invited research professor in the Brain Research Center, University of Veracruz (Mexico). She is the head of the research team Addiction and Neuroplasticity and has been the Ph.D advisor in 5 doctoral theses. She has published 40 papers in peer-reviewed international journals, and 7 books and chapters.

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Problems using benzodiazepines in elderly patients

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Benzodiazepines are widely used to treat anxiety and insomnia in elderly patients. The interest of this prescription is discussed in this article. The discussion is based on the pharmacological properties and adverse effects of benzodiazepines in the elderly subjects. The conclusions are that benzodiazepines should be rarely prescribed in this population; many patients treated by benzodiazepines should be withdrawn and other therapeutic strategies than benzodiazepines should be considered to treat anxiety and insomnia in the elderly patients.

Problems posed by BZDs in the aged patient are both of a pharmacodynamic and pharmacokinetic order. In comparison to young adult users, BZDs users in the aged are essentially women; the latter take these medicines during important periods in their lives and often have a strong comorbidity, such as cardiovascular or rhumatological problems or even psychiatric problems such as depression or panic disorders.

Aged patients who take BZDs at high doses can also consume other drugs such as alcohol and have often a psychiatric history. Some important secondary effects are associated with the utilisation of BZDs; essentially concerning falls and it has been noticed for some years that problems posed by aged car drivers can be effectively raised by BZDs. It is difficult to know if continual users of BZDs really have an advantage to other users. However, instruments like an indicator in the form of an algorithm, were developed to identify the appropriateness of prescribing of BZDs in elderly patients .It is certain that it is necessary in every possible measure to have a recourse strategy for cessation, to use as much as possible BZDs with a short half-life that are not oxidised, i.e. essentially BZDs that are not metabolised in the strictest sense of the term such as lorazepam or temazepam. Daily doses must be extremely limited and duration of use does not have to surpass 2 or 3 months in young patients.

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