



## The Pleasure System, Drugs and Society

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We are constantly seeking pleasurable stimuli, such as tasteful foods, an ice-cold beer or the exciting sexual intercourse. This search is associated to a special "brain reward system", thus named by the American neurobiologist James Olds. It is a complex neural network which is activated every time we do something pleasurable, thus causing us to want to do the same thing again. Biologically, it has a very specific and essential function: to assure the survival of the individual and of the species, by giving motivation to behaviors such as feeding, drinking and sexual coupling.

Unfortunately, not only normal physiological functions activate this system, but also alcohol and other substances of abuse, sometimes generating a much more intense pleasure than that of natural stimuli.

As authors Cláudio-da-Silva and Rocha-do-Amaral point out in their paper, [Drug Abuse](#) in this edition of *Brain & Mind*, "*Whenever a person uses a drug and the effect it produces is somehow pleasant, this effect gets a rewarding quality for that person*". In fact, recent studies have demonstrated that it is this brain reward system that underlies the action of drugs such as morphine, heroin, cocaine, alcohol, and even cigarette's nicotin.

Although it can initially lead to euphoria and a sensation of well-being, wrongfully giving to the user the idea of a beneficial effect, the chronic influence of drugs on the reward system, by its repetitive use, gives rise to a powerful and inescapable cycle of addiction, many times [damaging the brain](#) and other organs.

If we think better, this simple biological fact is behind an infinite number of personal and social dramas and of a probably irreversible damage to all societies which suffer, nowadays, from the heavy toll brought upon them by the illicit economic exploitation of drug addiction. In the USA, for example, it is estimated that at least 63% (1) of all criminal activities ranging from simple thefts to gang- and drug traffick-related assassinations, and an untold number of deaths and diseases, are directly or indirectly caused by the use of drugs of abuse by a relatively small parcel of the population. In countries such as Colombia, and in the great cities of Brazil, these statistics may be even worse. It is, undoubtedly, a scaring epidemic, the greatest tragedy of the end of this century.

Because of all this, it is so urgent the need to understand the cerebral mechanisms of drug addiction by the Neurosciences. How it occurs? Is it possible to block it?

The aim of experiments carried out by many scientists is to discover the chemical nature of the reward-mediating systems. Also in this edition, Dr. J. Martins de Oliveira presents, in his paper "[The Reward Deficiency Syndrome](#)", a review on the brain substrate of this intriguing system, the causes and consequences of its deficiency, and a brief explanation about the scant therapeutic successes in the field of drug addiction.

Therefore, the secrets of our understanding about the control of brain functions in drug addiction rests on our ability to grasp the chemical processes of information transmission in the central nervous system. If we are able to understand how they work in the generation of abnormal behavior, and if we know better about its neurochemistry, eventually we will be able to correct or to block these alterations.

An impressive bit of information which has emerged from the innumerable investigations in this field is that the action of exceedingly small levels of drugs that reach the brain alter behavior in such a powerful manner; by interfering with the normal mechanisms of neurotransmission. A fundamental discovery made in the 60s, which was later confirmed for many other substances of abuse, is that our brain has neurotransmitters with a chemical structure very similar to these very drugs (such as the endorphins, meaning, literally, endogenous morphines!) and chemical receptors in cell membranes which react specifically to these small levels of circulating drugs.

But that's not all. A better understanding of the individual psychological and social forces which loom behind the phenomenon of drug addiction is also required. After all, we already know that all human beings possess the same brain reward systems, neurotransmitters and receptors; however, only a small percentage of us succumb to drug abuse.

This is a key question, to be answered in the coming Millennium; and which we would like to help to uncover, in "Brain & Mind" Magazine.

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