

PROLOGUE

THE USE OF NEUROSCIENCE AS A STRATEGY IN THE PREVENTION AND TREATMENT OF ADDICTIONS

In the last forty years several strategies have been used in the prevention and treatment of the addictions. Public policies include the attempts to decrease the traffic, the consumption and the availability of the drugs and to educate the youth and the children to protect them from the risks of using drugs. Despite all these measures the problem of addiction as a public health problem has increased and it is likely than will continue to grow in the future. It is clear that there is a need to implement new measures of prevention, treatment and rehabilitation of the addictive disorders to complement and supplement these public policies.

At the meeting of the UN on Drugs that took place in Austria, in the year 2001, Mexico, proposed that the scientific knowledge that neuroscience has provided in the last few years, should be used to fight drug addiction. This is clearly not the total answer to the problem but it is an essential part of the strategy to fight drug addiction. Without any doubt, the advances in the comprehension of the drug addictive phenomenon should be part of the public health policies for prevention, treatment and rehabilitation of the afflicted by addictions. We have been able to identify several areas where the scientific advances have shown to be useful.

1) There has been an increasing knowledge in neurotransmitters and receptors involved in the various addictions and, in general, there has been a vast knowledge in the basic neurochemistry and physiology of these molecules. These include the opiate receptor, the dopamine receptor, the serotonin receptor, GABA receptor and others. Last year the Nobel Prize was awarded to Paul Greengard and Arvid Carlsson who initially discovered that dopamine is deficient in patients with Parkinson's disease. The dopamine and the dopamine receptors are essential in the production of the euphoric symptoms that addicts seek so avidly.

2) There has been a new knowledge of the human Genoma. There is hope that with this emergent knowledge some new forms of therapy will emerge. These include Genetic therapy and Pharmacogenomics. They are likely to be of great importance for the future treatment and prevention of addiction. The identification of the gene or genes that are involved in addictions (e.g. alcoholism) is under research in several parts of the world. We now know that several mental disorders including manic depressive illness and schizophrenia have an important genetic basis.

3) It has become increasingly clear that there is need to identify people who are vulnerable to addictions. It is likely that children with attention deficit disorder are under increased risk of developing addiction to nicotine and perhaps to other drugs. Children with a family history of alcoholism are also more susceptible of developing alcoholism. There is an urgent need of clinical scales for early detection of vulnerable individuals that may develop, later in life, alcoholism and tobacco addiction. This knowledge is of prime importance for the development of primary prevention. Future research is needed to identify these groups from the biological and social viewpoints. It is also important to analyze the interaction between the biological and the social aspects.

4) Some vaccines have been developed in the treatment of addictions. The antibodies block the addictive substances in the blood and thereby avoid the entry of the substances into the central nervous system. Two vaccines, at least, have been developed. One is the vaccine against nicotine that in the near future will be available in the U.S. market (Nic Vax). There has been a great advance in the development of a vaccine against cocaine addiction. These vaccines will be very useful in the treatment and rehabilitation of many patients.

5) One of the most important strategies is the blocking of receptors at the brain. Thus, the nicotine receptor can be blocked with Bupropion (Wellbutrin), the opiate receptor with Methadone, Naltrexone and Buprenorphin and the diverse alcohol receptors with Acamprosate, and others such as Naltrexone a long acting opiate receptor blockade has been recently released for the treatment of alcoholism (ReVia). It is important to emphasize that there has been a great advance in the area of receptor blockade. There is optimism for the future in this type of research.

In summary there is an increasing knowledge in the area of neuroscience that has aided in the comprehension of the addictive phenomenon

and several new therapies have appeared in the treatment and rehabilitation of these patients. In the future it is likely that genetic therapy, pharmacogenetics, the identification of genes, the identification of vulnerable people through biologic markers and more knowledge of neurotransmitters and receptors will help in the prevention and treatment of addictions area of opiate receptors and there is much optimism that in the future more of this kind of therapeutic interventions will be developed.

In summary there is an increasing knowledge in neuroscience wich has contributed to the understanding of the phenomenon of addictions, above all in receptors and neurotransmitters. As a result, new pharmacological treatments have emerged. In the future it will be possible that genetic therapy, pharmacogenomics, genetic mapping and the identifying of vulnerable groups through biological markers will become a great help in the prevention and treatment of addictions.

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