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Interaction of neurotransmitters with alcohol in cases of depression

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Evidence suggests that alcohol affects brain function by interacting with multiple neurotransmitter systems, thereby disrupting the delicate balance between inhibitory and excitatory neurotransmitters. It is often said that depression results from a chemical imbalance, but that figure of speech doesn't capture how complex the disease is. Research suggests that depression doesn't spring from simply having too much or too little of certain brain chemicals. Rather, depression has many possible causes, including faulty mood regulation by the brain, genetic vulnerability, stressful life events, medications, and medical problems. Short-term alcohol exposure tilts this balance in favor of inhibitory influences. After long-term alcohol equilibrium, these neurological changes occur as the development of tolerance to alcohol's effects. When alcohol consumption is abruptly discontinued or reduced, these compensatory changes are no longer opposed by the presence of alcohol, thereby leading to the excitation of neurotransmitter systems and the development of alcohol withdrawal syndrome. Long term alcohol intake also induces changes in many neurotransmitter systems that ultimately lead to the development of craving and alcohol-seeking behavior. It is believed that several of these forces interact to bring on depression. To be sure, chemicals are involved in this process, but it is not a simple matter of one chemical being too low and another too high. Rather, many chemicals are involved, working both inside and outside nerve cells. There are millions, even billions, of chemical reactions that make up the dynamic system that is responsible for your mood, perceptions, and how you experience life. With this level of complexity, you can see how two people might have similar symptoms of depression, but the problem on the inside, and therefore what treatments will work best, may be entirely different. Researchers have learned much about the biology of depression. They've identified genes that make individuals more vulnerable to low moods and influence how an individual responds to drug therapy. One day, these discoveries should lead to better, more individualized treatment (see: "From the lab to your medicine cabinet"), but that is likely to be years away. And while researchers know more now than ever before about how the brain regulates mood, their understanding of the biology of depression is far from complete. What follows is an overview of the current understanding of the major factors believed to play a role in depression. Serotonin is an important brain chemical that acts as a neurotransmitter to communicate information among nerve cells. Serotonin's actions have been linked to alcohol's effects on the brain and to alcohol abuse. Alcoholics and experimental animals that consume large quantities of alcohol show evidence of differences in brain serotonin levels compared with nonalcoholic. Both short- and long-term alcohol exposures also affect the serotonin receptors that convert the chemical signal produced by serotonin into functional changes in the signal-receiving cell. Drugs that act on these receptors alter alcohol consumption in both humans and animals. Serotonin, along with other neurotransmitters, also may contribute to alcohol's intoxicating and rewarding effects, and abnormalities in the brain's serotonin system appear to play an important role in the brain processes underlying alcohol abuse.

Biography

Anil Batta is presently Professor and Senior Consultant in Baba Farid University of Health Sciences/GGS Medical College, Faridkot, Punjab, India. He did his MBBS and MD in Medical Biochemistry from Govt. Medical College, Patiala in 1984 and 1991, respectively. His research interest is mainly in clinical application especially cancer and drug de-addiction. He has supervised more than 15 MD, MSc and Doctorate researches and published more than 30 international research papers. He is the Chief Editor of *America's Journal of Biochemistry*. He is also working as Advisor to the Editorial Board of *International Journal of Biological and Medical Research*. Recently, he has been Deputy Advisor to *Pakistan Medical Journal of Biochemistry*. He has been attached as Technical Advisor to various national and international conferences on Biochemistry. He has been attached as hi-tech endocrinal, genetics and automated lab director of GGS Medical College, Faridkot. He has chaired various sessions in Biochemistry meets.

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