



Libyan International Medical University
Faculty of Basic Medical Science



“Mechanisms Of Manic Depressive Illness”

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1. Introduction:

1.1 Manic depressive illness

1.1.1 **Definition:** Manic depressive illness, is a mental health condition that causes extreme mood swings that include emotional highs (mania or hypomania) and lows (depression).

1.1.2 **Causes:** The causes of Manic depressive illness likely vary between individuals and the exact mechanism underlying the disorder remains unclear. Genetic influences are believed to account for 60–80 percent of the risk of developing the disorder indicating a strong hereditary component. Twin studies have been limited by relatively small sample sizes but have indicated a substantial genetic contribution, as well as environmental influence. Less commonly Manic depressive illness occur as a result of or in association with a neurological condition or injury, Such conditions and injuries include stroke, traumatic brain injury, HIV infection¹.

1.1.3 **Mechanisms** not entirely understood in their complexity by medical researchers at this point in time. There are several theories that can be applied to explain why the function of the brain changes to cause the characteristic symptoms, such as extreme mood swings. These mechanisms include the function of neurotransmitters in the brain, as well as specific structural and functional characteristics of the brain². The effects of hormones and neurotransmitters as they relate to mania and depression are extremely complex and we will discuss it regarding to the some studies.

2. Discussion:

2.1 Manic Depressive Neural Processes:

The neural processes involved in the pathophysiology of Manic depressive illness are not well understood, and there are several mechanisms that are thought to play a role. Several neural transmitters appear to be involved, particularly Serotonin, Glutamate, GABA, Dopamine, Norepinephrine and Melatonin³.

2.1.1 Role of Serotonin in Manic depressive:

Serotonin is a neurotransmitter that is synthesized from the amino acid tryptophan. Decreased levels of serotonin are commonly found in patients with manic depressive illness and depression. Many antidepressant medications, including monoamine oxidase inhibitors, selective serotonin reuptake inhibitors and tricyclic antidepressants reduce the symptoms of depression by increasing the concentration of serotonin in the brain⁴.

2.1.2 Role of Glutamate and GABA:

The amino acid glutamate is the most abundant excitatory neurotransmitter in the brain. A study published in the December 2007 issue of “Biological Psychiatry” reports that glutamate levels are higher in certain regions of the brain in patients with Manic depressive illness. Many mood-stabilizing drugs used to treat Manic depressive illness are known to decrease the excitatory actions of glutamate⁵.

Gamma-amino butyric acid, or GABA, is an inhibitory neurotransmitter synthesized from the amino acid glutamate. GABA modulates the activity of several other neurotransmitters, including dopamine, serotonin and norepinephrine. An article in the July 2001 issue of “Neuropsychopharmacology” states that the actions of GABA in the brains of Manic depressive patients are significantly blunted⁶.

2.1.3 **Role of Dopamine and Norepinephrine:**

Dopamine is a neurotransmitter synthesized from the amino acid tyrosine. It is known to affect the reward centers of the brain and also is involved in regulating sleep, motivation, attention and learning. A review in a 2007 issue of the journal “Acta Psychiatrica Scandinavica Supplementum” concludes that dopamine plays a role in the cyclical shifts from mania to depression in patients with Manic depressive illness. This review notes that several studies provide evidence that dopamine levels are high during manic episodes and depression is initiated upon the subsequent down-regulation of dopamine⁷.

Norepinephrine is a neurotransmitter that is synthesized from dopamine and is released by neurons in the brain in response to stress. Patients with Manic depressive illness commonly have decreased levels of norepinephrine in the brain⁸.

2.1.4 **Role of Melatonin:**

Melatonin is a hormone derived from the amino acid tryptophan. It is secreted by the pineal gland in the brain, and many of its actions are the result of it acting similar to a neurotransmitter. Melatonin regulates sleep-wake cycles, and its circulating levels vary throughout the day and night. In addition, melatonin modulates the activities of GABA and dopamine. A study in the January 2001 issue of the journal “Frontiers of Neuropharmacology” reports that the release of melatonin is altered in patients with Manic depressive illness⁹.

3. **Conclusions:**

Manic Depression, is a mental health condition that causes extreme mood swings that caused by a combination of genetic factors together with environmental insults so manic depression has been described simply as a neurodevelopmental disorder. Mechanisms not entirely understood several theories can explain why the function of the brain changes to cause the characteristic symptoms. These mechanisms include the function of neurotransmitters in the brain. Several neural transmitters involved in this disorder particularly Serotonin, Glutamate, GABA, Dopamine, Norepinephrine and Melatonin.

4. **References:**

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