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## TECH TALK"

### Affective Disorders

#### Introduction

Affective disorders pertain to disorders of emotion, including depression and anxiety and mania. Affective disorders are the combined product of factors of genetic origin and of environmental and lifestyle influences. Of all disorders, depression is the most common psychiatric disorder by far. About 14% of the population will experience clinical depression in their lifetime. Of these, an alarming 15% will, unfortunately, commit suicide. The helplessness of depression is not a quiet, passive state, rather it's an active, all-consuming dreadfulness!

Continuous bouts of HPA (hypothalamic-pituitary-adrenal) activation pose a personal toll, resulting in; irritable bowel syndrome, migraine and tension headaches, neck and spine problems, temporomandibular (TMJ) dysfunction, heart disease, skin rashes, slow recovery from viral and bacterial infections, insomnia, alcoholism and drug abuse. Trauma also poses a socio-economic toll, affecting aggression and violence, family breakup, and lost productivity in the workplace, not to forget the hundreds of millions spent annually on illicit and prescription drugs. The effects of cortisol damages neurons of the hippocampus and in turn impairs declarative or explicit memory, the ability to recall details of events.

#### How it Happens

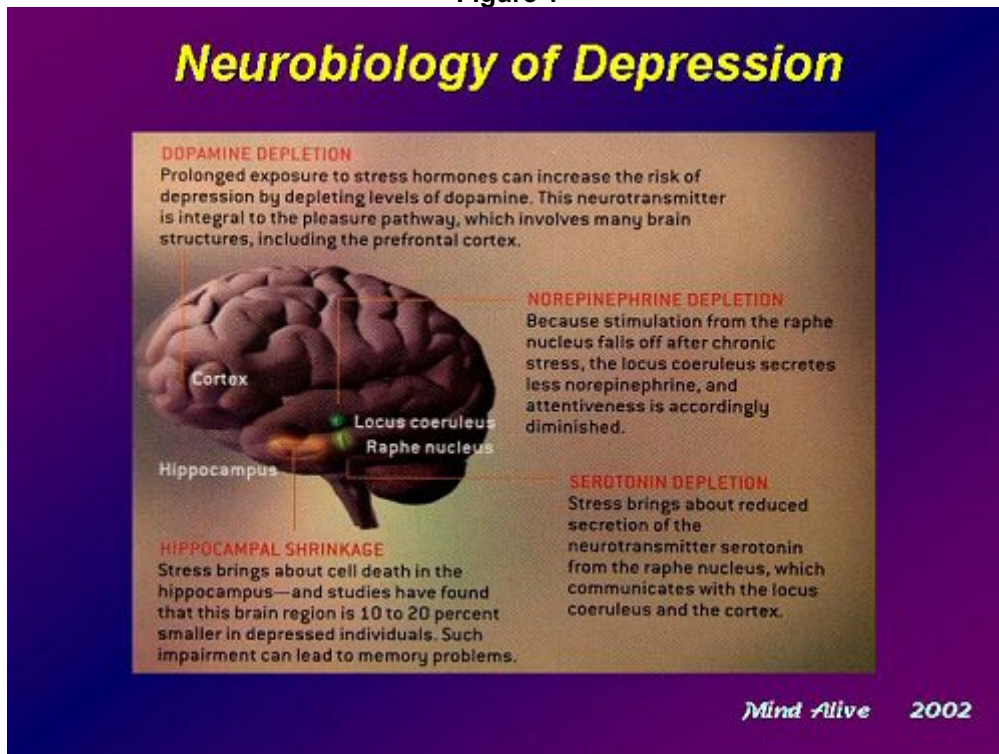
Depression, anxiety, suicide and the serotonin connection are all outcomes of the processes of the hypothalamic-pituitary-adrenal (HPA) axis. This is a "triangle" in which the hypothalamus and pituitary glands in the brain communicate with the adrenals. In response to stress, the hypothalamus releases corticotrophin-releasing factor (CRF), in turn causing the anterior pituitary to make adrenocorticotrophic hormone, which in turn causes the adrenals to produce glucocorticoids such as cortisol. Cortisol raises blood sugar concentrations, increases energy to the periphery and inhibits the immune system. Serotonin is part of the HPA axis in that it sets the threshold of the flight-or-fight response to the level of stimulation or perceived threat.

#### The Result

Aggression and depression are associated with alterations of serotonin, norepinephrine and dopamine. The threshold of how threatening one perceives an event is based on serotonin and the response level and direction of aggression is dependent upon norepinephrine. High levels of norepinephrine turn the aggression outward while low levels turn the aggression inward, and therefore into suicide. With trauma, GABA receptor losses (from cortisol) in the amygdala set one's "idling" speed to high, producing feelings of anxiousness and irritability. Genetic, environmental and family factors play a significant role in setting and exceeding the threshold of aggression and suicidal tendencies. There are children raised in a good loving home and because of genetic influences, are traumatized by every little event, a genetic connection and there are also those children who are born genetically fine but traumatized through blatant abuse. Both can become much the same result in the end.

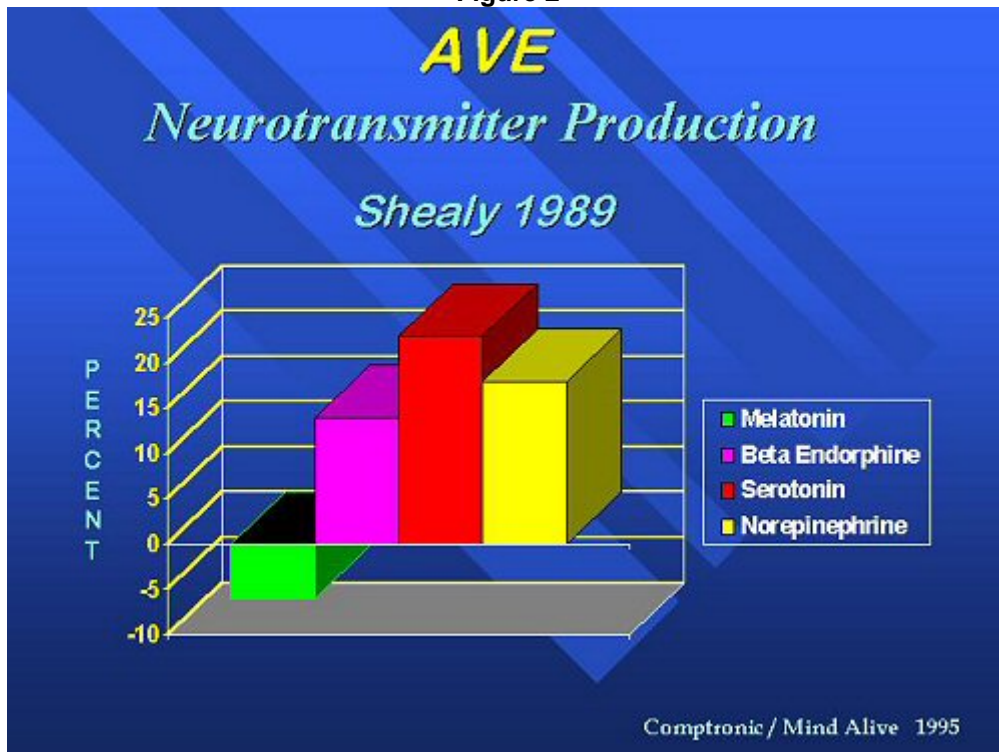
Figure 1 shown the brain regions affected during depression and the neurotransmitters involved. Notice the low serotonin and norepinephrine.

Figure 1



Audio-visual entrainment (AVE) is an effective tool for dissociating the depressed/anxious person out of his/her destructive thoughts, leaving them with emotional neutrality and somatic restabilization as is easily observable when measuring heart rate variability. Shealy's work showed that 30 minutes of white-light AVE at 10Hz had a significant impact on blood serum levels of neurotransmitters, increasing endorphine, serotonin and norepinephrine, all elements for counteracting depression, as shown in Figure 2.

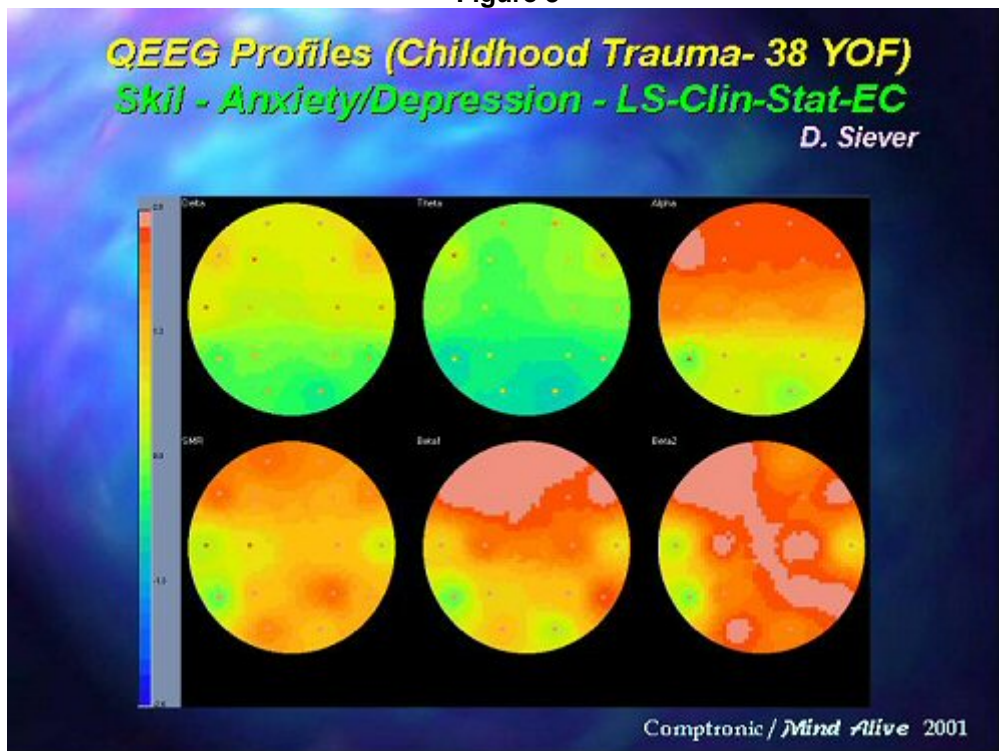
Figure 2



## Brain Activity

It is known that the left hemisphere activates (and therefore suppresses alpha electrical activity as seen on an EEG) with happy thoughts and the right hemisphere activates (suppresses alpha) with negative thoughts. Right brain strokes spawn cheerful survivors while left brain strokes leave the survivor with depression, which supports the "happy-left" and "depressed-right" scenario. Other studies, including my own observations, have shown increased left frontal alpha concurrent with negative thoughts. As one could expect, people with unresolved trauma are plagued with negative thoughts, often waiting for something bad to happen to them, thereby increasing right brain activity and become even more negative. Figure 3 is a statistical analysis as shown on the Skil database (Serman, 1999) of that of a young woman with constant negative and depressed thoughts (high left frontal alpha) coupled with high anxiety (high levels of beta activity).

Figure 3



Our "depression" preset session (C4 on the DAVID PAL & 26 on the DAVID Paradise XL+, XL and TC - version 3) has been shown to reduce the amount of left/right asymmetry in depressives and get them on the road to recovery. It does this by stimulating beta into the left hemisphere and alpha into the right. And as a result, AVE plays an important role in settling down adults and children. We know of many homes that have more than one DAVID in them for all family members to use following a stressful, tiring day in the modern world!