

HEALTH NEWS

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NEUROLOGY

Time for a new look at feelings

New evidence shows that feelings emotions are as much about dopamine as serotonin, and that cortisol may be the key. **Katy Chance** speaks to Johannesburg-based neurosurgeon Dr Ian Weinberg about neurological developments

FOR years the buzzword in treating depression and most mood disorders, as the psychiatric world calls them, has been serotonin, and specifically SSRI (selective serotonin reuptake inhibitor) antidepressants. Increasing serotonin has been the common chemical route for improving depression.

Newer evidence shows that increasing serotonin decreases dopamine levels, and dopamine is the "mediating neurotransmitter" for the brain's "seat of pleasure and gratification".

Dr Ian Weinberg is a Joburg-based neurosurgeon and creator of the lauded Triangles Model used in his pioneering psycho-neuro-immunology work. In a soon to be published paper, A Proposed Heuristic Model of Consciousness and Emotion, he expands on new thinking that the two "defined emotional centres" of the brain are the amygdala and the nucleus accumbens.

The amygdala is the centre for anxiety, panic and, when it is activated sufficiently, anger. Weinberg describes it as the fear centre, and says it "plays a major role in emotional memory".

In his paper, Weinberg goes on to say that all other emotions are derived from the interplay of these two emotional centres.

"The nucleus accumbens is the gratification and pleasure centre, fired by dopamine neurotrans-

mitters. SSRI antidepressants diminish anxiety," he says.

"But what has been discovered is that, while increasing serotonin, they deplete dopamine, which is critical for gratification. To trigger the nucleus accumbens to improve the ability to feel pleasure is vital, as lack of gratification may be what depression is about."

Although he notes that there is "no definition for depression", Weinberg describes it as feeling "helpless-hopeless".

While not against psychology or psychiatry, Weinberg wanted empirical evidence for this discovery. The world of psychology is "too abstract", he says, "and can't be pinned down to something with a foundation in organic reality". He founded a context based in neurochemistry. And he got it.

As well as the work with monkeys — activating the nucleus accumbens as a counter pole to the amygdala, proving that they work together — Weinberg refers to a study by German neurosurgeons in conjunction with US scientists at John Hopkins University in Maryland, US.

Twelve severely depressed people who were nonresponsive to medication and even electroconvulsive therapy, and who were essentially pre-suicidal, were treated by deep-brain stimulation of the nucleus accumbens in both brain hemispheres.

"There were immediate and

marked increases in gratification levels," says Weinberg. "Their medications could be diminished, and there was a drop in anxiety, which wasn't part of the study."

The change was measured by a positron emission tomography (PET) scan, recording changed activity in the amygdala with the nucleus accumbens stimulation.

"We've proved that tweaking these centres work and that they are connected. Despite the small sample the results were so dramatic they are considered significant and revolutionary."

The two brain areas are seen as a "counterbalance" for emotions and for altering the mind-state chemistry. Consciousness, says Weinberg, must be seen as part of a constant chemical reticulation system that feeds "every human's striving for gratification and for a move away from anxiety".

Weinberg talks of people with anhedonia, without the ability to feel pleasure, and how some turn to "help" from recreational drugs, smoking, alcohol or eating. "But these are compensatory, they are not triggering the right areas properly as they are not altering the mind-state chemistry."

Pivotal to our mind-state chemistry — and something that feeds directly into his work in psycho-neuro-immunology — is the hormone cortisol. Its levels and effects on the amygdala can work in utero.

"As cortisol is an endocrine, people are starting to talk about psycho-neuro-endocrinology as it incorporates hormones and the whole metabolism, not just immunity from mental and physical problems," Weinberg says.

Cortisol is secreted during stress and too much of it can suppress immunity and seriously affect neurochemistry. We live in a world where "cortisol has gone nuts!" according to Weinberg.

"When a mother is stressed in pregnancy it sensitises the amygdala in the foetus and this can promote excessive fear and/or anxiety in the newborn. If the neonate experiences deprivation in any way, it pushes up the cortisol levels and amplifies fear and anxiety," he says.

When Weinberg talks about potential, he means neurological potential, not the more ethereal notion of personality types or character traits. "We are all born with the prospect of either being blessed or cursed as victims," he says. "This is our neurochemical 'heritage'."

A neonate has needs, such as the need for food, comfort and a threshold level of nurturing that is chemically controlled, and these are related to cortisol, which is regulated by the pituitary gland.

According to Weinberg's paper, "chemically raised levels of cortisol have also been shown to disrupt ... short-term memory,

contextual memory and memory recall", which explains, neurochemically not anecdotally, why stressed people are accident prone and more likely to lose the car keys, or lose their rag.

It also explains why stressed and fear-based people are more likely to get ill or fall into a state of helpless-hopeless; an "activated amygdala also results in a raised cortisol level, which has far-reaching effects on immune function and general metabolism".

So a panicky baby grows into a stressed adult, with impaired mind-state chemistry due to the open floodgates of cortisol.

The good news is that, with the findings of the function and interplay of the brain centres, cortisol levels can be decreased through proper stimulation of the nucleus accumbens and its attendant "significant diminished metabolic activity" in the amygdala.

Again, the alteration in brain activity and the neurochemistry that comes with it have been objectively measured by MRIs.

This may not please the warm and fuzzy set who want mental health to be a more subjective and, often, spiritually based outcome, but those who believe adaptive responses to circumstance and the potential for happiness and health are a product of brain functioning, and not as a result of keeping a journal of our thoughts, will be deeply gratified.



COUNTERBALANCE: Recent scientific developments support the argument that our emotional state is dependent on a delicate balancing act between the amygdala and nucleus accumbens Picture: THINKSTOCK



Edmund Hillary - First man to summit Mount Everest in 1953

OFTEN, 'NEARLY' IS NOT NEARLY GOOD ENOUGH.

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