

What every good counsellor and psychologist should know when dealing with depressed clients on medication.

Although counsellors and psychologists deal with emotional matters it is surprising how few have a strong understanding about the mind and its physical expression, the brain. This may not be unreasonable in relation to the enormous development of knowledge that has come from brain research over the last 20 years or so. George Bush proclaimed the 1990's as The Decade of the Brain and that was a valuable beginning, but what do we do with the knowledge? More importantly, what is being done?

In September 2003, in *Scientific American*, Gary Stix discussed the idea that this might be the Decade of Behaviour, which is a good comment. But I wonder if this decade is better spent as the decade of learning and integrating these new understandings.

One of the discoveries that has truly altered our neuro-scientific approach to the brain is that it is more plastic, in more ways and for longer than was previously thought. Simplistically, this means that it is possible to learn, rearrange, replace and regrow within the brain in ways that are very relevant to the use of prescription medication and psychotherapeutic treatment.

There are a host of important names that have risen into the limelight. Who would have thought that a neuroscientist would be 'cool': Steven Pinker, one of the funniest writers of detailed information (*The Language Instinct, How the Mind Works*); Antonio Damasio (*Descartes Error, The Feeling of What Happens: Body and Emotion in the Making of Consciousness*), V.S. Ramachandran (*Phantom Limbs, A Brief Tour of Consciousness*); Daniel Dennett (*Kinds of Minds, Consciousness Explained*); Joseph LeDoux (*The Emotional Brain; Synaptic Self*); Susan Blackmore (*The Meme Machine; An Introduction to Consciousness*); Susan Greenfield (*The Human Brain: A Guided Tour, Brain Story*) are great examples and their popular publications have become 'best sellers'! These, and many others, are an irresistible source of information about the 'thing' that we are really dealing with when we help people who are having trouble coping with life – the brain/mind.

Much work has been done observing and studying the effects of selected lesions in animal brains and of human subjects who have suffered lesions from natural causes. From the time that Phineus Gage sent his gunpowder ramrod through his frontal lobes and survived, only to suffer the demise of his personality and his better judgement, to the extraordinary discoveries of pioneers like Dr Amen, who has allowed us to actually see the brain alter during behaviour in patients with ADD, we have begun to do more than just sit back and wonder at the mystery of the mind.

The discovery of neurotransmitters and the specific nature of their function has allowed for a raft of medications to 'normalise' brain chemical balance. But, on a social level, humans seem to have a greater desire for a 'magic bullet' than for a holistic understanding of what the *body* is seeking to achieve when it exhibits illness.

It is arguable that the body indicates its needs in a fairly clumsy fashion. Evolution has produced a system that improves our chances of survival. The messages are not necessarily clear or particularly concise. The simple human capacity to 'feel sick' requires a doctor to undergo years of study in order to be able to interpret the specific nature of the patient's 'sickness'.

We also produce a fairly clumsy indicator of emotional imbalance by feeling 'depressed'. Much of the psychological literature acknowledges that we have some innate sense of who we are or are best able to be (the internal environment), and when there is disharmony with the external environment, the body indicates this with feelings – being in emotional pain, unhappiness, discontentment, depression. Self-medication can be a risk to survival. Our innate sense to do things like resting and eating well can be very helpful, but easing the pain with alcohol, drugs, or the ultimate and most damaging 'self medication', suicide, is not any kind of help.

Our biggest problem, as human beings, is that we are still evolving and many of the wonderful advances in our biology, and especially our brain, have some unpleasant side effects that have yet to be resolved. I am astounded how the extraordinary mental development that allows the average 4-6 year old to appreciate their Theory of Mind (or as Ramachandran calls it – the theory of other peoples' minds) also marks the introduction of lying – 'I didn't do it!' 'It was the dog.' With their new ability to realise that they have a unique view of the world and that other people may not know what they know is an extraordinary breakthrough in perception that introduces us to the extraordinary world of the inner self and the magnificence of our imagination.

But the blessing of the imagination can be a burden, too. We can (as we now know) positively alter the functioning of the body through biofeedback. We can also anticipate the future, but if we anticipate poorly we can manifest fearfulness and dark displeasures in our mind and this 'negative thinking' can manifest in our body. The neurotransmitters in our brain are involved in this process, which is only to be expected. They can be involved as cause, co-operator and/or responders to our state of being.

So what is the process involved in the use of 'anti-depressant' drugs. This is where it gets truly fascinating. The following description is drawn largely from Joseph LeDoux in *Synaptic Self* with support from others like Cozolino in *The Neuroscience of Psychotherapy* and Andrewes in *Neuropsychology: From Theory to Practice*.

LeDoux argues that the real action occurs in the synapses. There are some 10^{15} connections in the brain from a base collection of 100 billion neurons. (This is equivalent to $1/5^{\text{th}}$ of the estimated number of particles in the universe!) If only we were able to hit specific neurons and synapses then we might well have a 'magic bullet', but we are still restricted to affecting more than we need (a major reason for side-effects). Still, we have been able to discover that there are some neurotransmitters (and/or neuromodulators) that can affect limited areas of the brain. The most widespread neurotransmitters are the excitory glutamate and the inhibitive GABA, but the discovery of the monoamine neurotransmitters - serotonin, dopamine, epinephrin (adrenalin) and norepinephrine (noradrenalin) has allowed for a more specific treatment of depressive symptoms.

Serotonin has been targeted as it seems to have relevance to positive mood. Certainly the other monoamines have their relevance, but we will leave their story and concentrate on the nature of Serotonin and the SSRI (selected serotonin reuptake inhibitor) group of drugs. The principal available products are Prozac, Luvox, Paxil, Zoloft, Ciprimil and Lexapro. Like illness, depression is not a simple disorder and can express itself differently in different people, so some adjustment of medication is not unusual. But what is really going on up there in the synapses?

The most common underlying cause of depression is prolonged stress. Under stress the adrenal cortex secretes cortisol in order to prepare the body to defend itself from a clear and present danger, but the story is much more complex than this. It is the amygdala (and some other regions of the brain) that respond to stress and excite neurons in the hypothalamus to release CRF (corticotrophin-releasing factor) into the pituitary gland which releases ACTH (adrenocorticotrophin hormone) which travels through the bloodstream to the adrenal cortex causing an increased secretion of cortisol. Amongst the many areas of the body that are affected by cortisol, it also attaches to receptors in the hippocampus. When a suitable number of receptors are occupied the hippocampus tells the hypothalamus to stop producing CRF and, so, the system regulates. We are designed to be mobilised for short periods, for the brief time of being under attack, but as Robert Sapolsky suggests, not for a thirty year mortgage!

Prolonged stress can damage the hippocampus, actually causing neuron death. As the hippocampus is concerned with explicit or declarative memory, stress can compromise thinking. Cell shrinkage and death can occur in the CA₃ region, but the dentate gyrus is affected by the

reduction of neurogenesis. Neurogenesis increases when learning occurs and decreases when stress occurs. This is probably why stressed people often have a smaller hippocampus, but what is more important is that their neural system is in a severely disadvantaged state for learning.

The hypothalamic-pituitary-adrenal axis (HPA axis) was not designed to make us depressed, but to help us deal with danger and difficulty in order to survive. Our stressful culture is outside of the natural set-up of the body and without some kind of alteration of the thinking which leads us to interpret day to day life as stressful, we are disadvantaged. It is by altering beliefs that induce a stressful interpretation of life that makes psychotherapy an effective treatment against stress, but if the mind is unable to learn then psychotherapy can be ineffective or, at least, much slower.

Anti-depressant treatment can have a positive effect in breaking the destructive cycle of CA₃ death and dentate gyrus loss of cell growth. This is achieved by the excitory effect of Serotonin on GABA which has an inhibitory effect on neuronal action potential in the amygdala (which is naturally designed to be less easily excitable anyway) and the HPA axis is diminished in its activity. When the synapses of the hippocampus become prepared for explicit learning, due to the sense of reduced stress induced by anti-depressant medication, it is possible for many of the psychotherapy methods to be more productive.

The caution is that, if the brain is prepared for learning, then it is likely that something will be learnt, so it is vital that patients on medication have a positive and productive therapy program to enable them to learn things that will take them away from their cycle of stress. The last thing we want them to learn is that if they pop that tiny white pill into their mouth then all their troubles will go away – mainly because this is simply not true. Medication is like giving a child a good breakfast before school: it is the quality of the lessons given in the classroom that have enormous bearing on how their lives develop.

Cognitive Behavioural Therapy and Rational Emotive Behavioural Therapy are being seen to have a strong positive effect, although not in all cases. The various forms of imaginal therapies are effective, Solution Based and Narrative Therapies also work. There is an argument that almost any therapy can work as long as the patient is encouraged to learn what they need to know in relation to their innate sense of self potential. (It does, however, seem that the one-off motivational buzz is not enough as this can be similar to ‘the little white pill’ that requires repeat doses.) A patient needs to find a therapist that they are prepared to work with and who helps them work with themselves. Just like medication this might need some adjustment to find the best mix.

In conclusion, the lack of instantaneous response to an SSRI indicates that it is not enough to simply increase the presence of serotonin. It seems that the delayed effects of medication (2-6 weeks) may be because of the time it takes the hippocampus to recover from the effects of stress and for the brain to return to a condition suitable for learning. Success of treatment is then best measured by the nature of the learning that occurs. The evidence seems to be supporting the co-operation of the prescribing and the therapeutic practitioner (and/or other therapeutic elements such as family, friends etc).

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