THE NEUROBIOLOGICAL UNDERPINNINGS OF THE MENTAL HEALTH RENAISSANCE

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ABSTRACT

Major advances in neurobiological research during the last decade have changed the traditional landscape of mental health.

A paradigm shift has emerged since the days when “talking therapies” were seen as an auxiliary service to the “pax medica” model. Recent breakthroughs in neural imaging indicate that the effect of mental health services and more specifically “talking therapies” not only assist in changing the behaviour of the mentally unwell but also change neural activity and even change neural structure especially in the prefrontal cortex, hippocampus, anterior cingulate gyrus and amygdala. These breakthroughs provide critical scientific building blocks for the mental health revolution.

This paper explores a number of the neurobiological breakthroughs in the treatment of mental health disorders. The implications of neuroplasticity and neurogenesis for mental health are explored. Recent findings regarding changing neural blood flow by means of talking therapies and the implications for treatment are briefly addressed.

The need for an interest group to further assist mental health workers to integrate neurobiological data by means of talking therapies in such a way as to maximize outcomes for more clients in a more cost effective way will be put forward.

1. INTRODUCTION

In 1998 Nobel prize winner in medicine, Eric Kandel published a landmark article in the American Journal of Psychiatry “A New Intellectual Framework for Psychiatry” focussing on the relationship between the mind and the brain in the light of modern biology. He states “...we are in the midst of a remarkable scientific revolution, a revolution that is transforming our understanding of life’s processes – the nature of disease and of medical therapeutics...it will have a profound impact on our understanding of mind.” (Kandel 1998). This work is one of the key contributitions to the dawn of the new mental health renaissance. He argues that modern psychiatry needs to have a fundamental understanding of the biological components of behaviour. In 2009 Lloyd Linford and John Arden published another key article “Brain Based Therapy and the Pax Medica”. They argue that since the discovery of Tricyclics antidepressants in the 1960’s a profound shift happens from treating the mentally unwell with psychotherapeutic interventions to medication as preferred mode of treatment (Linford, L & Arden, J.B. 2009).

Around the same time as the discovery of the tricycle antidepressants, Hans Eysenck, answered the question how psychotherapy change us by stating “It doesn”t” and indicated that “Psychotherapy was a mere passing of the time” (Eysenck 1952). Timothy Leary found that people on wait lists did “just as well” as those receiving treatment. The shift away from psychotherapy to pharmacological interventions began.

With the discovery of the first SSRI (Fluoxetine – Prozac) in 1974, the shift towards pharmacological treatment for mental disorders became a “fait de complete”. As total fascination with medication ruled the focus in “therapy” was on assessing the level of chemical imbalance and adjusts this by means of chemical intervention.

Drug therapy became the easy way out of mental distress. In 2008 1 in 20 males and 1 in 10 females in the USA were taking antidepressants (Barber 2008). But the pax medica alliance

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was not complete – since 1972 Psychiatrist Aaron Beck worked on “indisputable evidence” of the effect of his approach – cognitive behavioural therapy. His work dovetailed seamlessly with the work of Robert Spitzer – the Diagnostical and Statistical Manual of Mental Disorders (APA 2000). The ultimate method of choice for treatment was a combination of drugs and CBT – and the pax medica model was complete – between drug treatment and CBT everything could be cured and empirically tested by means of randomised controlled studies – CBT is a method, a textbook to be followed.

Then the cracks start to appear – The work of Smith, Glass and Miller (1980) indicate the robust effectiveness of psychotherapy – not only CBT – almost all therapies are effective, almost all therapies have the same core – suddenly research outcomes were questioned – a myriad of variables were ignored in CBT studies (diagnosis was quite often the only variable) personal factors, resilience, expectations etc were almost always ignored. Lambert and Ogles (2004) found that who the patient is, is more important in treatment outcomes than the therapy used. Recently George Magdulski from Wollongong University questioned the “evidence based” theoretical rationale upon which CBT is founded (Magdulski 2010). In 2006 Lambert indicated psychotherapy is as effective as chemical interventions (Lambert 2006). Despite the growing number of research indicating the limitations of CBT and flaws in research methodology, CBT is still advocated by the National Health and medical Research Council (NHMRC) as primary intervention for all mental disorders (NHMRC1999; Murphy, K & Mathews, R. 2010)

During the pax medica time researchers often referred to the concept of a “chemical imbalance” in the brain as the problem and the drug as the solution. A fascinating study by the University of Oregon in 2008 indicated that positive research outcomes demonstrating the superiority of drugs over psychotherapy and or placebos were 12x more likely to be published that studies that indicated no or negative results (Turner, E.H. et. al. 2008). A study by McKay, Zac and Wampold (2006) reassessing depression trial data from the Institute for Mental Health found that the best psychiatrist did better with placebos than the worst psychiatrist with drugs.

It became clear that the brain is different from the liver, heart etc. The brain responds to the external environment resulting in chemical and structural changes. Emotional trauma can damage the brain – in its behaviour, functioning and structure. Many studies found the decrease of hippocampal volume and left pre frontal cortex and sub pre frontal structures in patients who suffered early childhood abuse. But the brain can also heal itself. Positive supportive environments change the brain chemicals, cortical blood flow and increase the capacity for neural plasticity and ultimately neurogenesis. The pax medica model seems to be over. The dawn of a new renaissance in mental health is already happening.

2. THE NEW MENTAL HEALTH PARADIGM

During the last eight years there were a flood of new publications focussing on mental health from neuroscientific perspective. This does not mean a study of the brain per se. What we do find is that research indicate the central role of the brain in –

- Behaviour
- Personality
- Relationship with self
- Relationship with others
- Relationship with environment

The brain is the receiver of information, the initiator of ideas and change agent for actions and behaviour – the crucial entity in what defines “us”.

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Current neuroscience has moved beyond the classical model of trying to understand its function to viewing the brain as a dynamic structure that moulds, and can be moulded, changes and can be changed, get stuck in patterns and can heal itself to get unstuck.

A few months ago John Arden published a book on neuroscience and psychotherapy (Arden 2010). Here he emphasises the need for a new wider and more comprehensive understanding of mental health. He argues that understanding the brain from a neuroscientific perspective provides the basis for a new model for mental health. We progressed further than the pax medica model. We progressed further than the “brain as fixed entity and behaviour as genetically predisposed” – model. The deterministic view of genetic predispositions has dramatically reduced due to recent brain studies regarding plasticity. Neuroscience tells us the brain is quite plastic and is changing all the time – the fascinating concept of neuroplasticity. There is even evidence of new brain cells (neurons) being born – the even more fascinating concept of neurogenesis. Neuroscience tells us how “talking therapies” change the brain – in terms of its behaviour, in terms of its chemical operations and even in terms of its structure. These findings were the ultimate nail in the coffin of the pax medica.

The question arises – does the emphasis on neuroscience and neurobiology means we have reached the end of the road for psychotherapy? If we understand the neurochemicals and neuro-electronics of the how the brain fire and wire together we can chemically and electronically modify its actions to achieve the wanted outcomes?!

The fascinating answer to this is quite the opposite – recent research in neurobiology underlines the dramatic impact of environment, external factors and talking therapies to effectively change behaviour, change neurochemicals, change cortical blood flow, change brain structure, enhance plasticity and activate neurogenesis.

Clinical research published in June 2010 indicate that combined treatment (medication and CBT) is contra-indicated as concurrent use of medication affects the acute release of cortisol during the extinction phase of exposure therapy and, in turn interferes with memory consolidation (Pontoski, K.E. & Heimberg, R.G. 2010; Otto et. al. 2010).

The message is clear - If we have a basic understanding of the neuroscience of psychotherapy our interventions with clients will be more effective in more ways in less time. We have moved away from promoting the superiority of certain methods but rather on utilising bioneuroscientific data in our interventions to address mental issues.

3. NEUROBIOLOGY – SIGNIFICANT DISCOVERIES

It is impossible in the limited timeframe to explore the extent of the recent neurobiological discoveries and the even more significant indicators of the implications of these discoveries for our society, law makers and primarily for mental health workers. I will briefly name some of the recent discoveries.

3.1 ONE BRAIN – TWO LOBES

For centuries we knew the brain has 2 lobes. Slowly we started to understand the effect of lateralisation of the brain since the classical observations of Paul Broca. The brain is lateralized in function – however not completely. There are major differences in left and right brain function – especially in the prefrontal cortex and sub prefrontal cortex regions. Many studies show that overactivity of the right prefrontal cortex is the result of a regulatory system
between the amygdala, orbito frontal cortex and prefrontal cortex resulting in unhelpful neurological loops that enhance increase in cortical blood flow and production of cortisol. The contra effect is a decrease in cortical blood flow to the left prefrontal cortex, decrease in Serotonin and GABA (gamma aminobutyric acid) and in terms of behaviour and pathology – resulting in decreased ability to problem solve and increased levels of stress. This result in the overactivity of the sympathetic nervous system activated through the limbic areas and increase in unhelpful patterns of avoidance, anxiety, panic, depression etc. Effective strategies to manage and even change these patterns have been identified (Wehrenberg, M. 2008).

3.2 THE DISCOVERY OF NEUROTRANSMITTERS

Currently more than 60 neurotransmitters have been identified. These transmitters cause the neurons to fire in certain patterns. The fascinating reality is that these transmitters can be controlled – not only through chemical interventions but more so through environmental stimuli – negative reactions as a result of negative experiences and positive changes through positive interventions. A basic understanding of the brain function in terms of these transmitters empower clients, therapists, family and carers to shift less helpful behaviour patterns and achieve more effective patterns.

3.3 MIRROR NEURONS

Neuroresearchers discovered that some neurons fire both in response to an observation of a highly specific relationship between an actor and an object and when the action is performed by the observer. These mirror neurons connect our visual and motor systems with frontal systems which are responsible for goal-directed behaviour. This discovery leads to many fascinating concepts – eg. the role in communication and learning. We know we learn by observation – now we have an understanding why. The existence of these neurons holds the key to our understanding of wellness or unwell-ness for individuals but also in a society (Cozolino, L. 2010). Mirror neurons act like the Bluetooth of the brain. My brain is not physically linked to yours with a wire – but that does not mean we are not interconnected. So if I am well – and I spend effective time/ interact with you – your mirror neurons kick in and if this interaction continues in a constructive manner – my wellness – activates – your neurons to fire in a way to promote your wellness in terms of specific behaviours.

3.4 PLASTICITY AND NEUROGENESIS

The ability of neurons to be plastic/flexible/adjust and even more so – to create new neurons are without doubt some of the most fascinating neurological findings ever made. These concepts tell us that the brain can change, it can heal itself, we can help our brain to heal itself and we can assist others to heal. We realise that the old dichotomy between spiritual, the mental realms and the physical nuts and bolts of our chemical makeup – this dualism that existed for centuries and caused devastating wars and witch-hunting exercises, could be lifted. Because of the uniqueness of our brains – we are unique beings who are spiritual, mindful, physical and social entities constantly questioning, experiencing and evolving towards higher levels of existing – for ourselves but also for others. We are one but we are many – we are more and more starting to understand how the concepts of mindfulness, mental health, responsibility to self and others, personal well being – but also our understanding my well-ness in terms of your well-ness and ultimately the markers that drive a healthy society towards quality of life – how all of this is not just a topic for those interested in mental health – but it is about the much bigger philosophical issue of who we are what we are and how we are in terms of US. This is a collective being where the interconnectedness of my brain to yours and our brains to the rest of our community provides us with the script

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for living. So if there is no proper care for one of us – my brain and your brain suffers – because of our integrated neural connectedness – the social impact of the message of mirror neurons.

Understanding mental health concepts – like fear – from a neurobiological perspective – not only helps us to treat fear on a micro perspective in the lives of our clients – but address the neurological effects of fear in such a way that we change the way we operate – and on a macro level – the ethics and values of a community and society to do things differently resulting in experiencing outcomes that are fundamentally different – these are the building blocks towards a new mental health paradigm!

4. SUMMARY – NEED FOR A WORKGROUP

It seems a workgroup to foster closer integration of neuroscience and psychotherapy is indicated. The emerging paradigm of neuropsychotherapy needs to empower clinicians to utilise neurobiological information as psychotherapeutic tool in their interventions. Studies on brain neuropsychotherapy indicate treatment can be more effective in less time (Cozolino 2010; Walter, H., Berger, M., Schell, K., 2009).

Some of the goals of the workgroup could be the –

- Identification of mediators and targets of psychotherapeutic effects
- Determination of new therapeutic routes using neurotechnology
- Design of psychotherapeutic interventions based on neuroscientific knowledge

On macro level we need to provide clinical information and guidelines to the keepers of the well being of our society – the policy-, lawmakers and mental health leaders about the quintessential indicators of how we exist, interact and behave and provide effective intervention strategies.

The Mental Health Renaissance brings new challenges and exciting new possibilities for talking therapies based on neuroscience to move the Helping Model forward to a Recovery Model and the Recovery Model forward to a Model enhancing Quality of Life.

REFERENCES


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