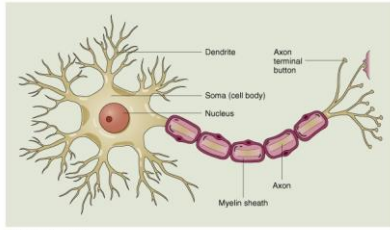


The Role of the Synaptic Gap in Learning and Stress

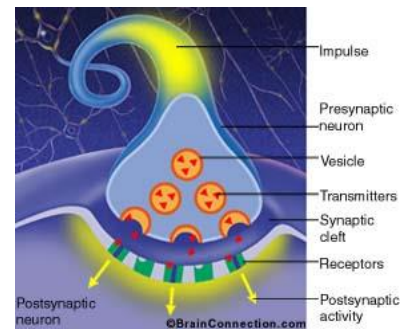
"The human brain is the most complicated object in the known universe!"

Robert Winston

In last week's article the development of dendrites around neurons was discussed with reference to the role of revision in the learning and growing situation. This week we will examine the body's response to stress and its impact on learning. Nicky Hayes, editor of Foundations of Psychology, states that 'the body's reaction to *assessment tasks, exams, tests*, may be characterized by a change in behaviour, disturbed sleep patterns, tiredness, worry, irregular eating habits, suppressed immune system and therefore increased infections and the inability to concentrate.



No neurons are joined together. Information (knowledge) moves from the dendrites, along the axons to the axon terminals where it 'jumps' across a gap to another set of dendrite receptors. This gap is known as the synaptic gap. The gap is filled with chemicals known as neurotransmitters. *Positive* transmitters such as serotonin, glutamate and dopamine, assist the electrical movement of what is thinking. *Negative* transmitters, Gamma aminobutyric acid, inhibit movement across the gap.



Any emotional response causes stress in the human body. Dr. Annette Lotter's research reveals that in a state of contentment the heart rate is between 2.5 and 5.5 millivolts (mv). A change of emotion, such as irritation, frustration or nervousness causes an increase in the heart rate, up to about 8mv. Greater emotional activity such as anger or excitement, rage and fear increases the rate of heartbeat. This response in turn increases the blood pressure and temperature within the body. The brain protects its very sensitive electronic circuitry by simply creating a bigger synaptic gap – the gap between neuro transmitting axons and the dendritic receptors. If the body did not protect itself in this way then there would be constant short-circuiting within the brain with the result being loss of memory through damage to the brain's neuro-networks!!

When this information is translated into the domain of learning and teaching it creates answers as to a rational explanation to why we suffer memory blocks during tests, exams and intense stressful situations. The brain, it can therefore be stated, is in a state of temporary survival mode! Stress thus closes off parts of the brain, taking blood to those parts where it is most needed in order to cope with the stress and to survive. It should be remembered that we are equipped with a brain primarily for survival through movement. It would seem logical therefore, that individuals learn coping mechanisms to deal with stressful situations in order to validly demonstrate their learning in testing or challenging times. Our students are exposed to many suitable techniques in their Thinking Skills lessons during their time at Clayfield College.

(Diagrams from Brainconnection.com)

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