YOUNG SCIENCE COMMUNICATORS' COMPETITION

NEWSPAPER/MAGAZINE ARTICLE

Awakening damaged brains... with a sleeping pill!

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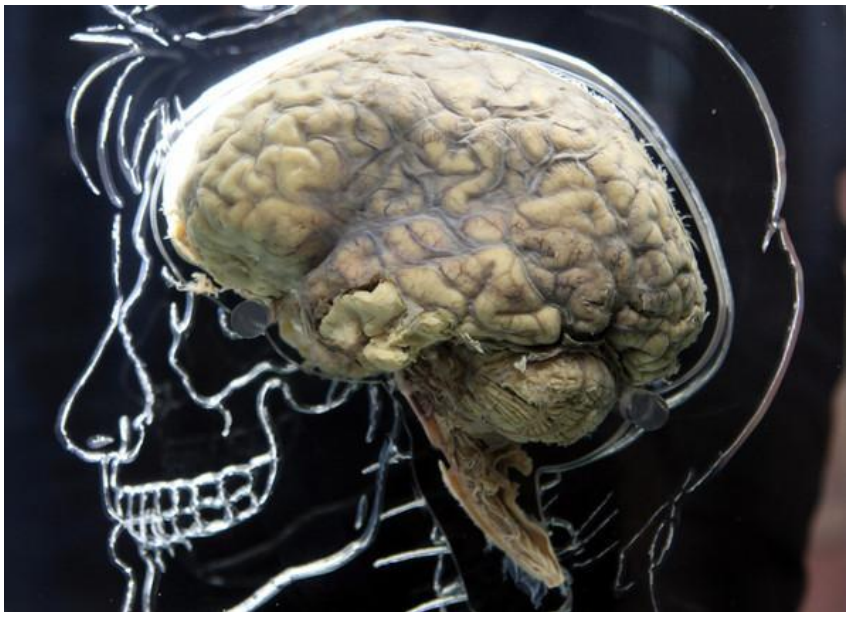
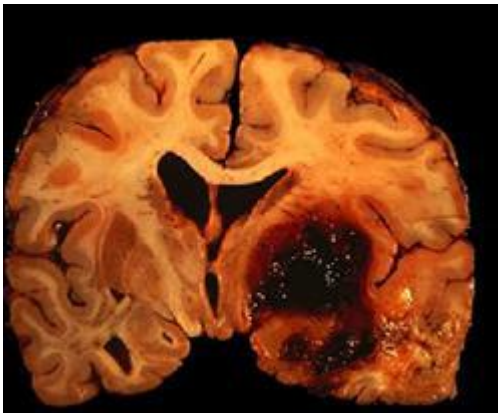
Allow me to introduce you, to yourself. Or more specifically, to your brain. Not to worry dear reader, I am referring of course to a generalised example, surveillance technology hasn't progressed to the point where images of our brains are kept somewhere in enormous data archives without our knowledge. The image to follow simply illustrates what lies within the confines of your skull. The vast interconnections formed by your neurons give rise your hopes, your dreams, your memories and vitally; your ability to interact with your surroundings. Or in short, they give rise, to "you".



The human brain

Despite the protection evolution has provided in the form of the skull, the membranes surrounding the brain, as well as liquid scaffolding in the form of circulating cerebrospinal

fluid, the brain remains incredibly sensitive to disturbances both from the outside world and within. A sufficiently severe knock from a car- or sporting-accident, or something as insidious as a stroke, may in an instant, change your life forever.



Bleeding within the brain following external trauma.

At present, modern technology can do very little to repair or replace lost neurological tissue. For the most part, as far as recovery is concerned, your brain is left to its own devices, therefore recovery of function takes months to years. Occasionally, following severe neurological insult, patients regain full function and lead perfectly normal lives. Yet for many, not favoured by Lady Luck on a given day, injuries are localised to important segments of the brain and the prognosis is significantly worse.

Estimates for the incidence of severe brain damage in South Africa have been calculated to be as high as 300 000 individuals per annum. For a single patient, the average cost for a year of palliative treatment and intense rehabilitation averages around R200 000. Sadly very few people can afford these measures, leaving them in search of alternatives or very often, without necessary care. Without factoring in income lost due to disability, it is already clear from the costs alone that brain damage places a significant burden, both on families as well as the economy as a whole.

But what if I told you that a little sleeping pill called zolpidem, may represent hope for approximately 6 - 10% of brain damaged individuals? Selling at just over R7 per 10mg tablet, zolpidem, originally marketed as Stilnox in South Africa, was developed by the French pharmaceutical corporation Sanofi-Aventis as a sleeping pill. In healthy individuals, it decreases the amount of time required to fall asleep (known as sleep latency). But if you give this pill to someone with brain damage, something miraculous happens. Often it's a small change, an improvement in speech, reduced muscle spasms, improved gait. In dramatic cases? Patients regain entire senses, use of limbs or are even roused from vegetative states! Returning to consciousness after many months, even years, of being completely unresponsive.

A South African Doctor by the name of HW Nel in conjunction with Professor R Clauss set this whole field of research in motion, when they made a startling observation during the early 2000's. Dr HW Nel responded to a call from the mother of a patient in a chronic vegetative state, reporting that her son steadily became increasingly aware after administration of the drug, but it wore off again roughly an hour thereafter. Believing this to be impossible he made his way to the patients place of residence only to find that miraculously, this was exactly the case.

Frustratingly this trend of a temporary improvement holds true for all patients that respond favourably to the drug. An initial increase in function which wears off as the drug is metabolised. Despite this caveat, any new neurological connections made while under the effect of drug, during a rehabilitation program for example, seem to be permanent. Suggesting that zolpidem may allow for new neurological pathways to be formed by transiently reactivating previously dormant regions that would otherwise have remained inactive.

The exact mechanisms behind this miraculous discovery remain largely theoretical at this stage but our research team along with many others around the globe are working feverishly in an attempt to elucidate the exact physiological pathways involved in an effort to provide more effective treatment options for brain damaged patients.