

Artificial Neurotransmitters

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Abstract—Artificial Neurotransmitters are a growing application to the field of biomedical engineering. They are able to provide the function of the non-active neurotransmitters in the body, and help with neurological diseases.

I. INTRODUCTION

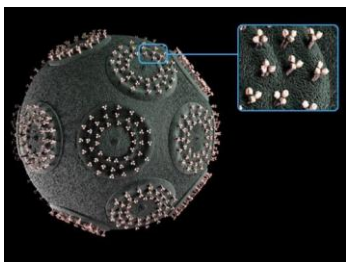
Neurotransmitters are small molecules that flow through the central nervous system from neuron to neuron. They are chemical messengers that are used to tell other neurons that they have received an impulse. These nerve impulses flow through the dendrites of a nerve cell, down the neuron to the presynaptic terminals. From the presynaptic terminals, the impulse is released to the synaptic cleft which is the area between neurons. The neurotransmitters are synthesized in the soma, then moves down the axon to the presynaptic terminals, and they activate the nerve receptors by sticking to them.

II. METHODS

There are two methods for the use of Artificial Neurotransmitters. The first is that of medication. For people suffering from depression, they have a lacking of the neurotransmitter of serotonin in their brain. This serotonin controls mood, and behavior, and to regulate the abnormal serotonin levels doctors prescribe medicine such as Prozac, Zoloft, or Celexa. These drugs trick people into thinking there are higher levels of serotonin in the brain.



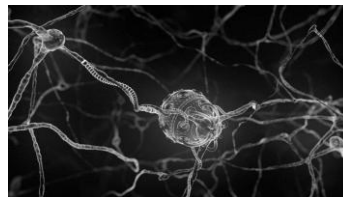
Neurotransmitters can also be injected in a controlled manner using electromagnetic antenna. These are installed at the synapse, and they are called capsula. The capsula are coated with binding proteins which allow them to connect to the neuron.



III. RESULTS

New types of Artificial Neurotransmitters are being explored by a group of Swedish scientists. These scientists used an electronically conductive plastic to create a new type

of electrode that releases neurotransmitters. The neurotransmitters are used to communicate naturally between brain cells. The advantage of this is that only neighboring cells that have receptors for the specific neurotransmitter will be activated. This small unit can be implanted into the body. This unit is designed so that the release of neurotransmitters happens as often or as little required as the patient needs. The research done by the Scientists has shown that these devices can be used to treat hearing loss, epilepsy and Parkinson's Disease.



IV. DISCUSSION

To conclude, Artificial Neurotransmitters are continuing to grow and develop, and are becoming more and more useful to the patient. They are starting to be made to be more precise when actually in the body. The surgery can be risky though to install the device in the nervous system. The unit needs to be installed in an exact location to be most effective, and if implanting is slightly off, it can cause harm to the patient. Due to this patients are skeptical about having the surgery done, but at the same time do not want to continue suffering from the neurological disease that they may have. The controversy may come about that installing this device into someone's central nervous system, or giving people medicine to slightly alter their mind is like playing the role of god, and changing someone's psychological state. This is necessary to rid some patients of these brutal symptoms of pain they may be experiencing.

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