AMMAR YASEEN MANSOUR

The Neural Synapses

The Trans-Synaptic Neural Conduction

(Personal View)

N.B. the Arabic version of this article is the reference, read it on the following links:

النَّقلُ عبرَ المَشابكِ العَصبيَّةِ (رؤيةٌ شخصيَّةٌ)

The Trans-Synaptic Neural Conduction (Personal View)

The neural conduction must be of a great simplicity and of a great velocity as well. Therefore, in order to verify if the trans-synaptic neural conduction respects this concept, I did a simple exercise and counted the steps of a such act. Surprisingly, I found them to be seven consecutive steps.

Henceforth, I am trying to find out another mechanism of the neural conduction through the synapses.

The Trans-Synaptic Neural Conduction

(International Hypothesis)

In the neural synapses, the Action Potential arrives to the presynaptic knob. It activates the voltage gated Ca^{++} channels (1). It opens the gates of these channels in order to let entering the positive Ca^{++} ions into the lumen (2). In turn, the incoming positive calcium ions activate the neural vesicles (3), inside which hide the neurotransmitters. The recently activated vesicles adhere to the cell membrane of the knob. Then, they inject the neurotransmitter into the synaptic cleft (4). The neurotransmitter traverses the synaptic cleft to another edge (5). They adhere to the external receptors of the postsynaptic dendrite (6). The activated receptors enforce certain ions channels to open their gates and to allow the specific ions to come into the lumen of the postsynaptic dendrite (7). Finally, we get the neural conduction through the neural synapses.

The Trans-Synaptic Neural Conduction

(Innovated Personal Hypothesis)

For more details concerning this item, see the linked video:

My personal view of neural conduction across the Synapse is based on these three conceptions. Firstly, the Trans-synaptic neural conduction is an electrical process. Secondly, the role of the Neurotransmitter is to make the Synaptic Cleft conductive to the electricity in permanent. Therefore, it is omnipresent in the Synaptic Cleft at rest as well as in action. Thirdly, the role of the Action Pressure Wave is to regenerate the Terminal Action Potential and its Terminal Electrical Current, and to fasten the passage of the latter through the Synaptic Cleft as well.

For more details concerning the Terminal Action Potential, see the linked video:

I illustrated the personal view of neural conduction through the neural synapses in three figures; ***figures (1), (2), (3).*** *However, I would like to clarify two essential points of personal conception, which make all the difference vis-à-vis the international conception.*

1. ***The Role of the Neurotransmitter***

Permanently, at rest as well as in action, the neural vesicles inject their burdens of the neurotransmitter into the synaptic cleft. In such a way, the neurotransmitter moistens the synaptic cleft, and makes it apt to conduct the Terminal Electrical Current whenever it is time; ***figure (1)****. Therefore, promptly the Terminal Electrical Current could pass to another side of the synapses;* ***figure (2).*** *Upon its passage, it releases the adsorbed ions and enforces them to come into the postsynaptic dendrite;* ***figure (3).***

2. ***The Role of the Action Pressure Wave***

The Action Pressure Wave is an innovated term that I often utilize in my personal hypothesis of neural conduction. It is a real pressure wave. In the Motor Neuron, the Action Pressure Wave is built at the Axon Hillock. In the Sensory Neuron, it is built at the root of the dendrites.

The Action Pressure Wave consists of a crest and a trough. The crest is of a positive pressure, while the trough is of a negative pressure. Coming

soon after the crest, the wave's trough is the essential factor in the generating of the Terminal Action Potential.

However, the wave's crest does fasten the passage of the Terminal Electrical Current through the synapse in two ways. Upon its arrival, the crest (front) of the Action Pressure Wave pushes the presynaptic edge toward the postsynaptic edge. Therefore, the two edges of the synaptic cleft become favorably closer to each other. Moreover, the wave's crest pushes the vesicles against the cell membrane of knob, and forces them to inject all their burdens of neurotransmitter inside the synaptic claeft; ***figure (2).***

Upon its arrival in the presynaptic knob, the negative pressure of the wave's trough opens the pressure gated Ca^{++} channels, and invites the positive Ca^{++} to come into the lumen at the same time. Hence after, the cathode of the Terminal Electrical Current is quite present; ***figure (3)****.*

To view the film that explains my personal conception of neural conduction in synapse, click on this link:

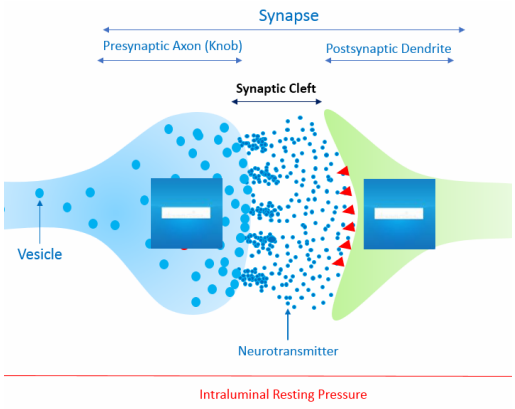

Figure (1)
The Neural Synapse (at rest)

For more details concerning this item, see the linked video:

The synapse consists of the presynaptic axon (Knob),
and the postsynaptic effector organ (Postsynaptic Dendrite).
The synaptic cleft separates the two parties from each other. The synaptic cleft is unconductive empty space per se. However, at rest as well as in action,
the neurotransmitter fills the synaptic cleft. Henc, the synaptic cleft becomes conductive to the electricity, and therefore ready to pass the Tterminal Electrical Current to the another edge at any time.
Moreover, for the ultimate function of the neural synapse itself, the neurotransmitter

adsorbs certain ion(s) (small triangles). They are positive ions (Na^+ , Ca^{++},..) in the excitatory synapses, and are negative ions (Cl^-,..) in the inhibitory synapses.

N.B. *the cytoplasm of the two parties of synapse are of negative polarity at rest, principally due to the intracellular proteins.*

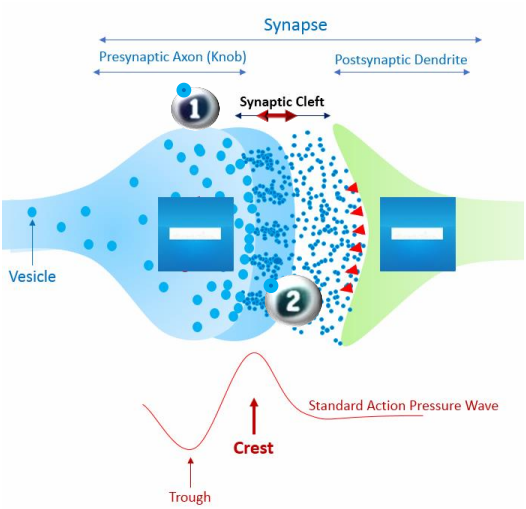

Figure (2)
The Neural Synapse (in action)
(The Functions of the Wave's Crest)

For more details concerning the 1st Function, see the linked video:
For more details concerning the 2nd Function, see the linked video:

*Under the influence of the positive pressure of its crest, the Action Pressure Wave pushes the presynaptic edge toward the postsynaptic edge. Therefore, the two edges of the synaptic cleft become favorably closer to each other (**1**). Moreover, the wave's crest pushes the vesicles against the cell membrane of the knob, and forces them to inject all their burdens of the neurotransmitter inside the synaptic cleft (**2**).*

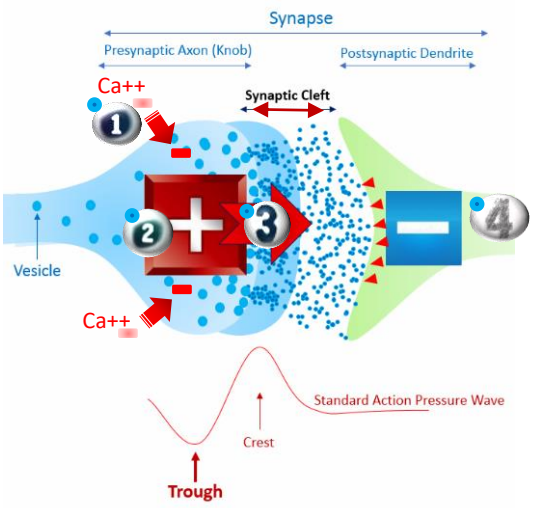

Figure (3)
The Neural Synapse (in action)
(The Function of the Wave's Trough)

For more details concerning this item, see the linked video:

In turn, the negative pressure of the wave's trough
*opens the gates of the pressure-gated Ca^{++} channels, and invites the Ca^{++} to come into the lumen of the knob (**1**).*
*The positive ions (Ca^{++}) will positively charge the knob, and make it the cathode of the future Terminal Electrical Current (**2**).*
The anode of the Terminal Electrical Current is already present, represented by the negative polarity of the postsynaptic dendrite.

Moreover, the in-between conductive intermediate is henceforth available thanks to the neurotransmitter that fills the synaptic cleft in permanent.

*From the recently charged positive presynaptic knob (the cathode) to the instinctively charged negative postsynaptic dendrite (the anode), the Terminal Electrical Current could hence freely pass (**3**).*

Upon its passage through the synaptic cleft,
the Terminal Electrical Current releases the adsorbed ions (the small triangles),
*and enforces them to come into the postsynaptic dendrite (**4**). The incoming ions could be the positive ions (Ca++, Na^{+},..) in the excitatory neural synapses, and should be the negative ions (Cl^{-},..) in the inhibitory synapses.*

……

In another context, one can also read:

- *Neural Conduction, Personal View vs. International View (Innovated)*
- *Upper Motor Neuron Lesions, Pathophysiology of Symptomatology*
- *Neural Conduction, Action Pressure Waves (Innovated)*
- *Neural Conduction, Action Potentials (Innovated)*
- *Neural Conduction, Action Electrical Currents (Innovated)*
- *The Function of Action Potentials (Innovated)*
- *The Three Phases of Neural Conduction (Innovated)*
- *Neural Conduction in the Synapse (Innovated)*
- *Sensory Receptors*

- *Nodes of Ranvier, the Equalizers (Innovated)*
- *Nodes of Ranvier, the Functions (Innovated)*
- *Nodes of Ranvier, First Function (Innovated)*
- *Nodes of Ranvier, Second Function (Innovated)*
- *Nodes of Ranvier, Third Function (Innovated)*
- *Node of Ranvier The Anatomy*
- *The Philosophy of Pain, Pain Comes First! (Innovated)*
- *The Philosophy of the Form (Innovated)*
- *Spinal Injury, Pathophysiology of Spinal Shock, Pathophysiology of Hyperreflexia*
- *Who Decides the Sex of Coming Baby?*
- *Spinal Shock (Innovated)*
- *The Clonus (Innovated)*
- *Hyperactivity Hyperreflexia (Innovated)*
- *Hyperreflexia, Extended Sector of Reflex*
- *Hyperreflexia, Bilateral Responses*
- *Hyperreflexia, Multiple Responses*
- *Nerve Conduction Study, Wrong Hypothesis is the Origin of the Misinterpretation (Innovated)*
- *Wallerian Degeneration (Innovated)*
- *Neural Regeneration (Innovated)*
- *Wallerian Degeneration Attacks Motor Axons, While Avoids Sensory Axons*
- *Barr Body, the Whole Story (Innovated)*

- *Boy or Girl, Mother Decides!*
- *Adam's Rib and Adam's Apple, Two Faces of one Sin*
- *The Black Hole is a (the) Falling Star?*
- *Adam's Rib, could be the Original Sin?*
- *Pronator Teres Syndrome, Struthers Like Ligament (Innovated)*
- *Function of Standard Action Potentials & Currents*
- *Posterior Interosseous Nerve Syndrome*
- *Spinal Reflex, New Hypothesis of Physiology*
- *Hyperreflexia, Innovated Pathophysiology*
- *Clonus, 1st Hypothesis of Pathophysiology*
- *Clonus, 2nd Hypothesis of Pathophysiology*
- *Clonus, Two Hypotheses of Pathophysiology*
- *Hyperreflexia (1), Pathophysiology of Hyperactivity*
- *Hyperreflexia (2), Pathophysiology of bilateral Responses*
- *Hyperreflexia (3), Pathophysiology of Extended Hyperreflex*
- *Hyperreflexia (4), Pathophysiology of Multi-Response Hyperreflex*
- *Barr Body, the Second Look*
- *Mitosis in Animal Cell*
- *Meiosis*
- *Universe Creation, Hypothesis of Continuous Cosmic Nebula*
- *Circulating Sweepers*
- *Pneumatic Petrous, Bilateral Temporal Hyperpneumatization*

- *Ulnar Nerve, Congenital Bilateral Dislocation*
- *Oocytogenesis*
- *Spermatogenesis*
- *This Woman Can Only Give Birth to Female Children*
- *This Woman Can Only Give Birth to Male Children*
- *This Woman Can Give Birth to Female Children More Than to Male Children*
- *This Woman Can Give Birth to Male Children More Than to Female Children*
- *This Woman Can Equally Give Birth to Male Children & to Female Children*
- *Piriformis Muscle Injection Personal Approach*
- *Eve Saved Human's Identity, Adam Ensured Human's Adaptation*
- *Corona Virus (Covid-19): After Humiliation, Is Targeting Our Genes*
- *Claw Hand Deformity (Brand Operation)*
- *Corona Virus (Covid-19): After Humiliation, Is Targeting Our Genes*
- *Barr Body; Mystery of Origin & Ignorance of Function*
- *The Multiple Sclerosis: The Causative Relationship Between The Galvanic Current & Multiple Sclerosis?*
- *Liver Hemangioma: Urgent Surgery of Giant Liver Hemangioma Because of Intra-Tumor Bleeding*
- *Cauda Equina Injury, New Surgical Approach*
- *Ulnar Dimelia, Mirror hand Deformity*
- *Carpal Tunnel Syndrome Complicated by Complete Rupture of Median Nerve*

- *Presacral Schwannoma*
- *Congenital Bilateral Thenar Hypoplasia*
- *Biceps Femoris' Long Head Syndrome (BFLHS)*
- *Algodystrophy Syndrome Complicated by Constricting Ring at the Proximal Border of the Edema*
- *Mandible Reconstruction Using Free Fibula Flap*
- *Non- Traumatic Non- Embolic Acute Thrombosis of Radial Artery (Buerger's Disease)*
- *Isolated Axillary Tuberculosis Lymphadenitis*
- *Free Para Scapular Flap (FPSF) for Skin Reconstruction*
- *Three Steps of Neural Conduction*

14/9/2018