Diversity of dendritic tree, functional consequences

“Dendrites are the remarkably beautiful tree-like structures that emerge from the cell body or soma of a neuron.” By Michael Häusser: Synaptic function: Dendritic democracy; 2001.

Firstly, we shall talk about dendrites. Their size can be from a few µm-s to a few mm-s. They’re the receivers of an excitatory impulse. And use voltage-gated ion channels, like Ca2+, Na+ and K+ pumps.  
Dendritic arborization is a multistep process where new neuron trees and branches form.

When we talk about dendritic tree diversity, we can say that there is a lot of different type of them. Every class of neuron have different looking dendritic arbors which imply that with the look of a neuron we can categorize them. This could mean that the dendritic tree structure differentiates how the neuron works.

There are a few functional consequences of the diversity of dendritic arbors. As I said before the structure of dendrites affects the way a neuron works, how it receives the data and how it sends it to be processing. There can be long strings and shorter, and there is even a smaller unit which is called dendritic spines they receive most of the excitatory impulses. The bigger the area they possess the better the impulse receiving of the neuron. The way the dendritic tree looks is always changing, this change is how a person can learn, communicate and process signals this is called neuroplasticity.

Malformations can happen which can cause serious mental health problems like depression, schizophrenia, anxiety etc.

There are a lot of different styles of neurons and they possess different looking dendritic trees. Because of that, I chose one particular one to talk about as an example. The pyramidal neuron.

It’s a multipolar neuron, it can be found in the brain, in the cerebral cortex and mostly found in mammals. It has multiple types of dendrites these can be seen on the exemplary picture, these are the Basal dendrite, Apical dendrite and Dendritic spines.

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