**The cortico-centric concept versus the thalamo-cortical concept**

The thalamus is located in the middle of the brain and is mainly responsible for relaying information between the cortex and subcortical areas. If we consider the network of information flow in the brain, the thalamus acts as a bottleneck.

It developed at the same time as time cortex, which is responsible for higher order neural functions. Most of the information about our external and environment is projected to the cortex by the thalamus. If the thalamus did not exist, the cortex would be separated from the “outer world”. Besides getting inputs, the cortex needs to have constant communication with the thalamus for proper functioning. Also, the thalamus gives feedback to the cortex about subcortical regions.

Before the nineteenth century there was no significance given to the cortex, it was only regarded as the rind surrounding the more important parts of the brain.

Then, in the 1870s , two scientist, Gustav Fritsch and Eduard Hitzig made a discovery, which confirmed that the cortex has a major role in our brain. They proved, that by electrical activation, the cortex induces movements. Then, all other major cognitive functions were discovered to be in connection with the cortex. This was the cortico-centric concept.

According to this view, the thalamus receives inputs only from sensory subcortical areas. Then, it relays the collected information to a given part of the cortex, called the primary sensory cortex. Based on this concept, all higher-order computations take place in the cortex.

In fact, not only one, but all cortical areas receive information from the thalamus. As the first concept stated, a part of the thalamus relays sensory information to the primary sensory cortex. In addition, some other parts send non-sensory subcortical information. These inputs can be excitatory and inhibitory as well, and they link the different regions of the cortex. There are also parts, that do not get any subcortical information. Instead, they communicate with the cortex exclusively.

The diversity of the nervous system can be represented by considering the diversity of neurons. Neurons build up only 0,3% of our body, but even this small percentage contains more types of cells, then the rest of the body. However, the thalamus is an exception, containing only one type of neural cells. But how can it perform such a complex role, with only a single type of neuron?

The diversity of the thalamus is in the diversity of inputs. It has three dimensions. The thalamus receives inputs from a large range of different brain regions compared to the cortex. These inputs can be morphologically and functionally diverse by containing inhibitory and excitatory terminals. These terminals with different origin and type can combined in many different variations inside the thalamus.

Source used:

<https://agykutatas.hu/hir/a-talamusz-es-a-sokfeleseg-dicserete-acsady-laszlo-szekfoglalo-eloadasa/?fbclid=IwAR33Ar8Krx2fmxXyOHHDFrDWyEW5fNzBG7vjRDtOwMMC8jIXRYULhUN7sqA>

<https://pubmed.ncbi.nlm.nih.gov/28333385/>

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