



Neuroscience

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Still taking the first steps

Although *Imhotep*, even in ancient Egypt, considered the brain to have some cognitive functions, this was not always the case in later times. Progress was slow in acquiring knowledge about the functions of this organ, and it doesn't seem difficult to accept that what we now call Neuroscience only gained autonomous status in the second half of the last century. It may seem strange, but we are still taking the first steps.

Reflecting on and studying the brain is to delve into understanding human nature itself and the complex phenomena of life, because humans are the only species that can attempt to explain the secrets of these phenomena through consciousness and the capacity for communication. We must admit that, unfortunately, the human mind does not yet possess the appropriate tools to do so.

Aware of the mission's challenges, the scientific community has enthusiastically engaged in its development. I consider the investment made in the last decade of the 20th century with the program known as the *Decade of the Brain*, first in the United States and then throughout the world, to be a fundamental milestone in this qualitative leap from a scientific point of view. This program brought together participants from diverse fields and gave rise to technology that significantly increased the resources for functional study of the nervous system. It became possible to experimentally study the system's function in volunteers without any type of dysfunction, whereas until then, function was suspected only through the analysis of dysfunction.

The construction of a scientific model capable of supporting this project is an excellent example of a complex system in which variables from various branches of knowledge interact. The response of nervous

system biology to the multiple study techniques that have been developed often creates interpretative difficulties. Electrical signals do not always correlate with chemical changes. It is very difficult to infer causality from correlation results.

The development of multiple ongoing projects around the world has revealed the need to rewrite the methods and content considered specific to each of the classic scientific domains; knowledge increasingly demands transdisciplinarity.

While neuroscience exemplifies the convergence of knowledge, each partner demands results that enrich their own body of knowledge. Projects are born focused on problems and recruit the most appropriate means to obtain answers. The suitability of techniques to the problem under study results in the progressive enrichment of the technique itself.

Interestingly, the influence of cultural archetypes on modern results remains important; rationality prevails over experimental empiricism. The neuron has been chosen as the interpretative key to neural function since the beginning of the 20th century, with the Nobel Prize awarded to Santiago Ramón & Cajal in 1906. Today we must admit its relative importance, with some constraint, as if it were the fall of an empire. We lack an understanding of the complex model, as if we were trying to solve a puzzle of millions of pieces without any guide. We know the micro-processes, but we lack the larger process.

The preliminary results that are emerging inform other disciplines that appropriate the prefix 'neuro' and consider themselves new. This even started with Philosophy, which in the 1980s christened a new chapter as Neurophilosophy, thanks to Patricia Churchland.

Neuroscience is now coveted as a hallmark of quality for initiatives in multiple fields, sometimes demanding more than it can deliver. The relationship with so-called Artificial Intelligence is of particular interest, where dialogue is fundamental. It is quite clear that Artificial Intelligence is integrated into the daily routine of the world, but this does not mean that the goal remains to create copies of humans. The living elements of the earth have learned to interact over millennia, learning from each other the mechanisms of necessary homeostasis; the intervention of a non-living process in this natural dialogue, incapable of recognizing error and learning from it, will inevitably lead to an imbalance.

The Faculty of Medical and Nursing Sciences, together with the Faculty of Medicine of the Universidade Católica Portuguesa, continuing its germinal structure based on the development of interdisciplinarity, has launched a degree in Neuroscience, thus creating its own voice open to the discussion of these important topics, both with partners from other fields of study and with the public.