INTUITION AND SCIENCE

Our curiosity about the nature of things is an innate characteristic of the human being, which begins to be outlined from childhood, when we constantly ask the why of all things. Over time, that innate curiosity evolves into the imagination of youth which, paraphrasing the Venezuelan biophysicist Raymundo Villegas (1931-2014), then begins to transform into the creative capacity of the future scientific researcher, which is strengthened with the study and the discipline.

This attraction to scrutinizing the secrets of the universe has led many of us to dedicate ourselves to scientific research, specializing more and more in recondite aspects of knowledge. For this we have been highly trained to know "more and more about less", following the accepted scientific method of observation and experimentation.

Modern scientific activity is highly structured around what the American philosopher Thomas Kuhn (1922-1996) called the "scientific paradigm" (*The structure of scientific revolutions*, 1962). Kuhn noted that the scientific community is extremely homogeneous and very conservative. It is made up of members who are trained at the same universities, participate in the same conferences, read the same journals, and have their projects and articles reviewed and approved by colleagues (peers) who think similar to us. This situation creates a "common science" paradigm that, while certainly preserving the quality of science, is not necessarily the best way to stimulate innovation.

However, promoting innovative ideas ("*out of the box ideas*") can be risky. If any of those ideas ever get a grant (which is rare), the risk of failure is very high. It is noteworthy that the same scientific community that places great value on creativity and innovation is, at the same time, risk averse. But, according to Kuhn, true scientific breakthrough occurs when a new paradigm emerges that is more satisfying than the one currently guiding the work of the scientific community.

The scientific work is directed to the search for new knowledge. In general, this new knowledge is the result of the progressive evolution of existing knowledge, often re-evaluated or analyzed with novel approaches, where the researcher's intuition plays a fundamental role. The definition of the Royal Spanish Academy of Language defines intuition as the "faculty of understanding things instantly, without the need for reasoning". But perhaps this official definition does not give enough credit to the phenomenon of unconscious intelligence that we all know as intuition, hunch, premonition, or simply feeling, which according to Gerd Gigerenzer (1947-) are characterized by:

- Appearing quickly in the consciousness
- Not clearly supported by reason or knowledge, and
- Strong enough to urge us to act.

The German psychologist Gerd Gigerenzer (*Gut Feelings, the intelligence of the unconscious*, 2007), argues that a large majority of our daily decisions are guided by intuition and not by a careful examination of prior knowledge. Even though scientists pride themselves on being totally rational, and sticking exclusively to the facts, in the design of a new working hypothesis they usually include some intuitive component that makes the research project more attractive and different from other projects.

In conversation with an ancient director of one of the National Institutes of Health of the United States, he confessed that one of the secrets that keep the creativity of science in the United States is not necessarily because of what is financed by the grants, but instead because of the innovative ideas that are not financed, but that the researcher explores on the side of the project, with a small percentage of the money obtained from the official grant.

A normal phenomenon in our countries is that a young scientist dreams of the possibility that a totally new idea, which has not occurred to anyone before, will result in a great discovery. Things don't happen that way, and although an innovative idea can separate the good scientist from the crowd, it takes tenacity and persistence to get the evidence that allows us to continue that path or, which is much more difficult, to abandon it. The Brazilian-British immunologist Sir Peter Medawar (1915-1987) already reminded us that, "I cannot give a scientist of any age better advice than this: the intensity of the conviction that a hypothesis is true has no influence on whether it is true or not" (*Advice to a young scientist*, 1979).

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