

Basic Sciences. Basis of Clinical Medicine.

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In light of current knowledge, it seems evident that the relationship between 21st century clinical medicine and basic sciences such as biology, chemistry, physics and others is close and long-standing. However, three centuries ago, medical science was almost the same as in ancient times. Very little was understood about the human being at this time and many causes of diseases were unknown. The ensuing discoveries were individual adventures of great importance, fundamentally in the basic sciences, and their contribution and legacy to today's medicine are indisputable ¹.

The purpose of the present editorial is an integrating exercise that encompasses: the historical review, the enumeration of certain scientific milestones, and a philosophical reflection that accompanies the concepts and the current situation. Let us see:

The development of microbiology (with the fundamental contribution of Louis Pasteur), provided the doctor the certainty to treat a fever caused by a large number of bacteria with antibiotics, that is to say, that hypothesis, derived from observation, became a verified

hypothesis. If fundamental contributions are concerned, we have Dr. Claude Bernard (contemporary and friend of Pasteur), who in the nineteenth century introduced the basic sciences into medical education ⁵. Through rigor and audacity, he achieved a significant step in what is now known as evidence-based medicine. His book: "Introduction to the study of experimental medicine (1865)", is the cornerstone of the development of medical physiology in addition to being a "classic" book of study. We also have the discoveries of Gregor Mendel, whose plant experiments allowed him to enunciate the laws that bear his name and describe the dominant and recessive characters in the genetic expression. At the beginning of the XX century, his works, which were carried out in an individual manner, were rediscovered by several researchers. More historical milestones were accomplished in this century. The discovery of penicillin, the works of Albert Einstein in physics and the discovery of the double helix of DNA by Watson and Crick.

At the same time, the medical field has

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witnessed the growth and development of medical schools around the world, with the aim (among several) of satisfying a growing need for medical specialists. Given the characteristics of today's world, we know that clinical work is much more complex than just treating patients and trying to cure them. Consequently, physician skills comprise mastering the basic sciences, proper interaction with the patient and the correct application of the medical prescription. Let us now introduce another concept.

Philosophy

How is it related to medicine? For outstanding men of science, it is a close and very important relationship. Mario Bunge, an outstanding physicist, writer and scientist tells us; "A good doctor puts a philosophical, materialistic and systemic system into practice. "If it were not so, we could fall into unfounded superstitions or hypotheses ³.

In addition, each part of the body would be treated as an independent organ and not as an integrated system. Hippocrates himself adhered to the material universe; in other words, alternative medicines and Freud's psychoanalysis would have caused his rejection. Bunge insists that the physician "philosophizes all the time" and for him, social sciences are very important in order to understand the individual as part of a specific population.

At this point, it is valid to ask: would a doctorate in basic sciences that includes philosophy to specific details be a correct solution? The answer is yes, but it is not that easy.

Today's world needs to seek collaboration and coexistence in projects. This, incidentally, generates the additional challenge of bringing together diverse professionals such as biologists, physicists and mathematicians (especially in biomedical engineering), and furthermore, understand and use well the technology in its diverse platforms with an adequate bioinformatics infrastructure ⁶.

In the post-truth era (the concept of philosophical-political dyes, full of paradoxes and changes, with diversity and inclusion occupying front pages, the desire for rediscovery has led, among others, to the rise of new concepts: translational medicine.

What does this Concept Include?

The execution of the term began at the beginning of the century and it is a process based on basic science aimed at clinical research. Dr. Katrina Kelner (Ph.D. in biology and neuroscience) and editor of the STM (Science translational medicine) journal sets forth that translational medicine uses basic scientific discoveries of the genetics, immunology, and engineering field for the treatment and diagnosis of human diseases ². In the expert's opinion, the novelty lies in changing the focus of attention from the problems and to take it to a "current" effect, that is to say, collaborative collective. A better prologue than what was previously known as preclinical (a philosophical prologue perhaps)?

Translational medicine is inevitably associated with a cultural change; with challenges and objectives.

From those distant discoveries, self-financed and made alone, we turn to the groups of researchers who are privately financed, globalized and hyper-connected. Let's take as a practical demonstration the National Cancer Institute in the USA ⁴. In the numerous articles highlighted this year, in one of them, there is talk of investigating well and prescribing better the different subtypes of cancer of the digestive system, as it occurs among appendix cancers concerning those of the gastrointestinal tract. Recent studies that analyzed the molecular characteristics of appendiceal cancers indicate that it would be a mistake to address them as part of the colon cancer "family". Doctor Jonh Paul Shen (one of the study directors and University of California at San Diego specialist) believes that it is obvious that a treatment for cancer of the appendix must be individualized, instead of administering chemotherapy tested in patients with colon cancer.

As we can see, everything indicates that it is necessary to have a vast quantity of information in order to have a good and representative map of the genomes so as to identify the different subtypes of cancer and administer proper treatment. Bioengineers, statisticians, clinical specialists, and pharmacists, among others, all gathered for a common goal. Have the concepts such as holistic or integral been left in the past? You be the judge, better said, you philosophize.

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