Presentation

THE VALUE OF MEDICAL specialties, measured in terms of the knowledge they have generated for the attention of health problems, is vast and unassailable. Progress in the medical sciences, which have focused traditionally on the study of differentiated organs and systems of the human body, and on specific alterations of their structure and function, have enabled the development of diagnostic and therapeutic techniques that have proved to be effective in counteracting various ailments.

However, medicine still faces great challenges as it struggles to develop effective treatments against clinical entities that, from time immemorial, have been in considerable measure untreatable, like cancer or diabetes, or against emerging illnesses in which new infectious agents play a leading role. The linear model still predominant in the medical field has not enabled researchers to go beyond the palliative scope of the treatments developed to face this type of ailments, which still achieve high figures in epidemiological reports.

The complex systems theory, based on the principles that rule dynamics and evolution of structures, that function as networks of intricate relationships, and encompass the knowledge of the features that emerge from these collective dynamics, provides the possibility for medical sciences to create research strategies capable of overcoming the conceptual and methodological limitations imputed to the existing etiological model, that limit their preventive and therapeutic capacities.

Departing from this conception of complex systems, based on the mathematical theory of dynamic systems, and the physical theory of non-linear systems, we strive to understand the mechanisms that cause that an organism should evolve from a state of wellbeing to one of disease, and to explain the dynamics of certain ailments in epidemiological terms, among other approaches.

The great surge of computational science has been a key element for the study of complex systems and, in the case of medical science, expresses a great density of interconnections within the organism from a molecular level up, and between this organism and its environment.

Knowledge of generic features of complex systems (that describe the dynamics of various natural and social phenomena) can contribute to a better understanding of the health-disease process and, starting from this framework, it is possible to conceptualize the transit from benign to malign attractors and vice versa.

In this issue, INTERdisciplina presents some notable advances in the study of various health problems, from the perspective of complex systems, which seem to promise some very important therapeutic achievements.

The strategy of interfering in the dynamic networks of the so-called complex ailments represents a paradigm shift, fully congruent with the inescapable perspective, increasingly present in scientific research and in the health field, established by the conjunction of medicine and complexity.