

Considerations about a thematic Supplement containing papers related to translational research

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The common understanding is that medical research in a department or in an area of clinical or surgical activity should be conducted in an eminently applied manner, without involving aspects of pure inquiry. In contrast to basic research, which is practically restricted to the understanding of the pathological, physiological or biomolecular processes of disease, experimental clinical research is of a practical, or even pragmatic nature. However, with the advances in knowledge and with the need for multidisciplinary and team work, modern investigation acquires a unique characteristic, i.e., it is performed in such a way that inquiry and application will occur in a synergistic translational manner.

The term ‘translational research’ first appeared in PubMed in 1993, sparked by the characterization of *BRCA1* and other cancer genes, which suggested immediate applications in early detection and treatment of cancer. Use of the term remained low throughout the 1990s, in just a handful of papers annually, until around 2000, after which it has cropped up in several hundred articles each year¹.

In 2000, the US Institute of Medicine convened the Clinical Research Roundtable, which held a series of meetings that are credited with placing translational research high on the agenda. The process pinpointed two blockages in the transfer of research knowledge into practice. The first roadblock (T1) was described by the roundtable as “the transfer of new understandings of disease mechanisms gained in the laboratory into the development of new methods for diagnosis, therapy, and prevention and their first testing in humans.” The roundtable described the second roadblock (T2) as “the translation of results from clinical studies into everyday clinical practice and health decision making.”²

In a comment published in 2008, Steven Woolf² stated that “translational research has different meanings for different

In medicine in general and in surgery in particular, investigation cannot be absolutely divided into basic or applied research in a simplistic manner, but should be formally defined as translational.
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people” and argued that the different types of translational research are separated by very fine lines. He sustained that if T2 results in knowledge necessary to improve health and the quality of life, then T1 should also include the sciences related to the population (epidemiology, psychology, economics, and behavioral sciences). Thus, we may conclude that translational research adopts a multidirectional integration of basic research and of research based on the patient and on the community².

There is no doubt that translational research is based on research within basic science and the question that arises is to what extent there is a flaw in the time to apply the knowledge acquired. It can be seen that an enormous effort is being devoted to biomedical research and also to the understanding of disease mechanisms, but that this huge amount of work does not result in gains regarding new treatments, diagnostic methods or preventive policies¹.

Over the last 30 years, clinical research and basic research have focused on different paths, with a distance between the bench and the bed that can be understood as a deep chasm between them, which neither the investigators in the basic area, busy with research, nor the physicians, busy with their patients, seem ready to bridge. In reality, what is lacking is communication between these two groups or, as stated earlier, interaction between them as if they represented a single unit consisting of a team of scientists. Translational research arises as a bridge between these two previously separated poles. In 2003, the US announced the creation of 60 Clinical and Translational Sciences Research Centers (CATS) supported by a grant of 500 million dollars a year to be shared by universities and medical centers throughout the country¹.

Translational research has been encouraged by

investment in training, research and infrastructure in order to help investigators to become involved in clinical research. The belief was that this would break down barriers and carry research “from the bench to the bed” and lead to more research on topics involving human beings and also samples that would generate hypotheses more relevant for people than for animal models¹.

Despite the extensive theory created about an ideal model of translational research, some challenges need to be met for this project to develop in a successful manner. Among the difficulties pointed out is the fact that basic-biomedical research has its own dynamics, with promotions and rewards mostly based on the number of papers published in renowned journals and not on the size of the contribution made to the advancement of medicine. And many physicians who treat patients – and earn their living for this – also have little time or inclination to continue to contribute to the complex basic literature. These two points obviously reduce the movement of knowledge and of the hypotheses generated between the two poles, i.e., from the bench to the bed and vice versa¹.

In addition, genomics, proteomics and all of these research lines are generating such a huge volume of drug targets and other discoveries that the pharmaceutical industry is having problems to digest them and transform them into effective medications for the population. Thus, with industry spending more on research but creating fewer products, it is natural that there should be a reduction of the effort to bring forth the new academic discoveries¹.

In view of the above considerations, professors of the Department of Surgery and Anatomy and myself as head of this department decided to compile a series of studies conducted within the various surgical areas and publish them in a special issue in the form of a thematic Supplement, in order to disseminate our activities in clinical and experimental research in the area of translational research. The journal chosen was *Acta Cirúrgica Brasileira* because of its credibility as a vehicle and because of the credibility of its founder and Editor, Professor Saul Goldenberg, as the person who maintains the academic-scientific credit of the journal. This time we chose the research from the bench to the bedside topic around which a series of studies were compiled based on experience in this type of research that actually guides the spirit of our department, a corollary of the vocation of the Medical School of Ribeirão Preto, USP itself and essentially representing the production of knowledge, of reflections about current questions based on personal experience and on the literature, demonstrating the scope of our university function and ultimately reflecting the strong relationship existing between the research laboratory and the hospital.^{3,4}

In our opinion, the involvement in research activity on a day-to-day basis, in addition to fulfilling its major objective of

contributing to the generation of knowledge, can and should have a relevant influence on other areas of professional activity such as the training of people in graduate courses, in projects of scientific initiation, in post-graduation *stricto sensu*, in Master’s or Doctoral investigations, and also in post-graduation *sensu lato*, i.e., in medical residency. Engaging in a research project may have an important impact on the acquisition of attitudes and skills that will be favorable in any area of professional activity, thus justifying the inclusion of research in any educational or training program.^{3,4}

In this supplement, we present experimental and clinical investigations carried out in our laboratories which most likely, within a short time, will be contributing to improving care for the patients treated in our hospitals, in different specialties. In the opposite direction, clinical research leads to experimental research questions to be addressed and implemented for the welfare of patients. We believe that, following the global trend, this research will be the springboard of knowledge in surgery^{1,5}.

Manuscripts about experimental models of congenital defects such as gastroschisis and congenital diaphragmatic hernia try to obtain answers about the cause of the secondary effects involved in these diseases. In gastroschisis, 10 to 40% of the fetuses are affected by intrauterine growth restriction and therefore the search for molecular mechanisms involving glucose uptake for growth, as well as the inflammatory pathways involved in the damage to the intestinal loops may contribute to the understanding of this finding. The same can be said about diaphragmatic hernias regarding the changes that may have occurred on the muscle margin, which did not develop and permitted the occurrence of protrusion of the intestinal loops into the chest. These responses should be investigated by combining knowledge about pharmacology, cell signaling and biochemical techniques that would permit an expanded application of basic research information to the necessities of surgical problems and would advance the understanding of these diseases.

To conclude, we trust that the studies presented here and peer reviewed in the different areas in question may help other investigators and assistant physicians in their daily activities.

References

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