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## **I Simpósio Interdisciplinar em Ciência, Tecnologia e Inovação em Produtos para Saúde**

Challenges in Pharmacy Education  
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### Abstract

According with the International Federation of Pharmacy:

“All pharmacy professionals will be able to demonstrate continuous development in their skills, knowledge and competences using appropriate standards and evidence-led professional development frameworks in all care, science and academic settings, and for the ultimate benefits of patients and civil society”. We review the current situation in the field of pharmacy both from the scientific and educational point of views. We will show some of the main challenges that represent big opportunities at the same time.

We face a new drug science based, primarily, on genomics, proteomics and computer science. New classes of drugs, and the so-called advanced therapies based in gene therapy, somatic cell therapies, such as CAR-T, tissue-engineered medicines, etc. are now broadly used. In the pharmaceutical technology we can see also big changes: nanoformulations of existing drugs can overcome common pharmaceutical problems by increasing solubility, limiting systemic toxicities, increasing bioavailability and improving immune-compatibility and cellular uptake. Finally, personalized medicine will change the science of pharmacy. Genetic technology could lead to an increasing role for pharmacy. There is a need to generate quality information on the safe and effective use of drugs in individual patients. Doctors would diagnose and pharmacists could select treatments based on pharmacogenetics. There was a need for appropriate education and getting the information infrastructure. Other challenges rested mainly in terms of bridging gaps: gaps between in vitro and in vivo experimentation; gaps between pre-clinical and clinical studies; gaps between pharmacology and therapeutics; and the overall population versus the individual patient.

The core of evidence-based medicine lays in the systematic review, and simpler and more effective ways are needed to communicate knowledge that could be used to answer the practical question of "how to treat Mr. X". This means that being familiar with research is mandatory. In this sense, the road map to the future in health care is driven by patients and families, and that means providing better education to patients and the wider audience; improving the education of healthcare professionals in holistic thinking and communication; restructuring healthcare delivery and developing a central common electronic record accessible by patients as well as professionals.



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The new pharmacist need a new training paradigm with pharmaceutical science in the middle linked to biochemistry, cell biology and all the other disciplines. This was the only way to move pharmaceutical science forward. The question is: how will pharmacists adapt to these new technologies and embrace the new opportunities they present to improve patient care, and how will these advances impact the interaction of pharmacists with other members of the healthcare team?

In this context, a group of institutions from Latin America and Europe are developing the COPHELA project (<http://cophela.eu>): Cooperation in Quality Assurance for Pharmacy Education and Training between Europe and Latin America. The main aims are the improvement in collaborative approach to pharmacy education with the creation of online pharmacy specialisation resources, the improvement in the ability of graduated pharmacists to positively impact on patient healthcare and industry and a greater recognition of the work of pharmacists among the population. In the EU: increased awareness of LA pharmacy education and practice, and of capacity of LA drug R&D and production. Increased contact with LA academic colleagues. Increased collaboration with the LA pharmaceutical industry. In safety issues and access to medicines: detection of falsified medicines, prevention of shortages, availability of hospital-only medicines via community, prescription and collaborative care, etc. In treatment outcomes: adherence, self-management, rationalize care of polymedicated patients, cheaper medicines via appropriate substitution, dosage adjustments, etc.