



## Editorial – Pharmaceutical Developments

The pharmaceutical industry plays a key role in Switzerland and is one of its largest employers. Research and innovation assure the future welfare of the industry and its continuing benefit to society. This journal will give an insight into expected future developments from new, emerging, and revolutionary technologies.

Pharmacy plays an increasingly important role in health-care: the last year has shown us how vaccines and medication will become more complex, with increasingly ingenious routes to their development and fabrication. But, pharmacy as a profession has many aspects, all of which are changing rapidly. The research pharmacist is confronted with the need to deploy skills from many different disciplines in the formulation of novel medicines. The industrial pharmacist will need skills in precision engineering alongside medicine processes and technologies. The role and the responsibility of the community-based pharmacist will acquire new dimensions of diagnosis and the supply of generic therapies.

This edition of the fully independent journal SWISS PHARMA 43 (2021) No. 4 will give an appreciation of the changing pharmacy world, emphasizing the roles of emerging technologies such as artificial intelligence, nano-pharmacy, and robotics. The changes in the pharmaceutical industry go beyond the research implications: they include the impact of Industry and the Internet of Things, and the new requirements in the education of the younger generation. The influence of society, economics, and politics will become ever more visible and ethical aspects will gain importance and require more attention from the points of view of bioethics, ethics of science, ethics of technology, and business ethics.

*This edition will focus on a few important and selected topics:*

The first chapter deals with the changes, needs, benefits, and constraints that the new, emerging technology of nano-science, technology and engineering will bring in the pharma world. Pharmaceutical nanotechnology will produce new and innovative medicines for improved and more efficient medical treatments, but delivering this innovative nano-pharma will impact on university education, pharma research, the process industry, economy, and society.

A second chapter highlights the impact of new trends in the processing and production of complex, targeted, and precision medicines and vaccines, as demonstrated in «Spray Freeze-Drying»: a key innovation in producing lyophilized, instant soluble pellets for the formulation of precision medicines and with the potential to manufacture nanocomposite vaccine formulations, which can be stored at room temperature.

A third chapter deals with Business Ethics in the Pharmaceutical Industry and Beyond: the understanding of the ethical dilemmas nanotechnology presents in the industry. Scientific integrity and integrity of data are necessary that these technologies are approved by health authorities. In addition, they need to be respected in all areas including business and all other human interactions. As a result, a global harmonization of the legal framework and

the ethical conduct need to be adopted. This measure is a prerequisite for a healthy society leading to a peaceful and sustainable world. For this purpose, it is important that all agree to replace any kind of the «Law of the Jungle» by a scientific method to find a «win-win» solution for all parties involved, leading to the survival of mankind.

The 4<sup>th</sup> chapter examines the requirements of the Swiss pharmacy curriculum [Ausbildung zum Apotheker (pharmasuisse.org); Formation de pharmaciens (pharmasuisse.org)] at the Federal Institute of Technology in Zurich, at the Universities of Basel, Bern, and Geneva with the goal to satisfy the needs of Swiss society and industry. The degrees offer a large spectrum of job opportunities in the various pharmaceutical sectors of society: retail (community), hospital pharmacies, cantonal regulatory authorities and the federal Swiss regulatory Office (<https://www.swissmedic.ch/swissmedic/en/home.html>), international organizations such as WHO in Geneva and in various areas of the large pharmaceutical industry in Switzerland such as in Analytical Pharmacy, Biopharmacy, Clinical Pharmacy, Drug Discovery, Formulation Research & Development, Production, Quality Assurance, Registration, etc. International companies such as Novartis and Roche also offer positions abroad.

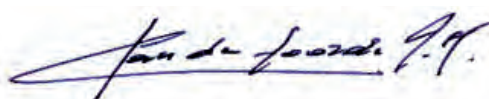
The 5<sup>th</sup> chapter is devoted to Life Science Studies at Universities of Applied Sciences offering specialization from environmental technology, to bioanalysis, biomedical engineering, chemistry and pharma technology being in the focus of this issue, information technology, and medical opportunities.

The 6<sup>th</sup> chapter is devoted to the topic of «Negotiation Engineering and Conflict Management» that is of primary importance in the field of international diplomacy. Artificial Intelligence, computational science, all emerging new technologies such as CIRSP, etc., require a transdisciplinary approach between the natural sciences – mathematics, physics, chemistry, biology, engineering – and the humanities – philosophy, law, sociology, and ethics – to reach optimal solutions for complex problems that span technology, science, ethics, politics, and society. In this context, Quantitative Negotiation Engineering is an innovative approach which could be most useful and valuable in contributing to solving a wide variety of problems in different fields and contexts in business and company negotiations. However, a sustainable «win-win» solution for all partners involved can be achieved *on the basis of scientific integrity and on the integrity of data. Indeed, scientific integrity and integrity of data are the common denominator of all contributions in this issue of SWISS PHARMA 43 (2021) No. 4.*

The final, 7<sup>th</sup>, chapter is devoted to the necessary restructuring of University studies to accommodate solutions for future problems in the modern society. Universities are often still strongly discipline-oriented although the society is mostly confronted with problems of a «multidisciplinary» character such as climate change, virus technology, treatments in medicine, and industrial advances. Solutions and inventions often originate in the interfaces between different disciplines. The modern approach to University education and research recognizes the need to cut across traditional boundaries. Universities are well placed to take on the challenges and create new Faculties and Departments that embody combinations of teaching and research that could never have been envisaged before. The EPFL (Ecole Polytechnique Fédérale de Lausanne) is already introducing the principle of «Trans disciplinarity» (<https://www.epfl.ch/research/services/fund-research/funding-opportunities/research-funding/interdisciplinary-seed-fund/>) with the recruitment of a Faculty Professor in interdisciplinary cancer research (<https://www.epfl.ch/about/working/faculty-position-in-interdisciplinary-cancer-research/>). A phenomenon that will become very popular in European universities in the future.

***SWISS PHARMA is a specialist journal designed for experts working in the pharmaceutical sector. However, the present issue is also intended for a broader readership, including the wider healthcare profession, University students in sciences and engineering, University academics in all disciplines, and education and science policymakers.***

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