



Future of pharmacology

The education of pharmacology has evolved over time, and this has given us a rich past era of pharmacology. The evolutionary changes started from teaching few extracts in isolation to the creation of a separate discipline of pharmacology and then to publications and development of pharmacology organizations. There are important milestones during the evolutionary process in pharmacology education that deserve special mention. Historically, many important drug discoveries were made upon induction on the basis of empirical observations, eventually transforming plant- or microorganism-derived substances into a therapeutic compound. While anecdotal and accidental observations may have their value, there is a need to explore molecular mechanisms and biological processes for improved opportunity recognition and a more rational design of drugs and clinical trials. Challenges remain for the pharmacologist to better understand the mechanisms of certain established drugs, such as the pluripotent anti-inflammatory effects of steroids or high-dose intravenous immunoglobulin preparations. Thus, there is a call for the modern pharmacologist to actively engage in basic and translational research and for the field to adopt new domains that were not traditionally linked to pharmacology. Note that the words “medicine,” “pharmaceutical” and “drug” are often used interchangeably and the word “drug” can also mean both a medicine and an illegal substance, depending on the context. In this chapter the word “pharmaceutical” is arbitrarily assigned to the end-products of the pharmaceutical industry that are used by patients. The concept of the concentration–response relationship has been central to pharmacology and of course remains central to the practice of medicine. Within the pharmaceutical industry the partnership of chemist and pharmacologist has been key. Within academia the role of the chemist has often been less evident and the links between pharmacology and physiology have been key – the pharmacologist using small molecular probes to perturb physiology and thereby elucidate mechanisms. Through careful identification of mechanisms and the development of chemicals that interfere with specific pathways, the introduction of powerful new medicines over the past 50 or so years has meant that doctors can now offer specific and effective treatments across a wide range of diseases. The pharmaceutical industry needs academia to train its scientific workforce and a career in industry is a common goal for graduates and postgraduates in pharmacology. Movement between academia and industry at more senior research levels is increasingly common and benefits both parties. However, career advice for postdoctoral research fellows on opportunities provided by industry remains

variable. The need for industry to increase its intake of clinician scientists provides an interesting insight into where academic pharmacology may be failing. The clinician scientists recruited tend to come from organ-based disciplines and not from within pharmacology/clinical pharmacology.

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