The future of medicine

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We are witnesses to an unparalleled period of advances in technology. Apple’s new iPad Air® is a mere 7.5 mm thin and weighs just 454 g. Its astounding new A7 chip allows 64-bit architecture, that up until now, would only be found on desktops. It works for 10 hours on battery power alone. It is millions of times more powerful than the first computers built less than 70 years ago, but is available at a fraction of the cost of these first behemoths that were built in large rooms. Is it true then, that advancements in the medical field, and in particular, those in the pharmaceutical sciences, are keeping up with technology’s logarithmic growth curve? You be the judge.

According to the National Institutes of Health of the US Department of Health and Human Services, pharmacogenomics and pharmacogenetics are novel ways of approaching medicine. Pharmacogenomics uses information about a person’s genetic makeup, or genome, to choose the drugs and drug doses that are likely to work best for that particular person. This new field combines the science of how drugs work, which we know as pharmacology, with the science of the human genome, called genomics, whereas pharmacogenetics is the study of how people’s genetic makeup affects their response to drugs.

One could ask what these new fields of study mean for us, as pharmacists. We know that, until recently, drugs were developed from the premise that in general, the same drug works the same in everybody. We now know that genomic research has changed the “one-size-fits-all” approach, and has introduced more personalised approaches to using and developing drugs. Pharmacogenomics will ensure optimal effectiveness of a specific drug for a specific person, and also identify the “best-fit” drug for a patient from the beginning, thereby making costly trial-and-error approaches unnecessary.

Pharmacogenetics is still in its infancy, and broad general application is unlikely in the near future. However, research in these fields will definitely impact on new drug development. Pharmacogenetic tests identify variations in a person’s genetic makeup, thereby predicting his or her response to a medicine. These results will indicate whether or not a patient will respond to a particular medicine or suffer side-effects. Researchers are of the opinion that pharmacogenetics will also be able to predict the optimal dosage for an individual.

Rapid growth is occurring in the field of pharmacogenomics, and will soon lead to better ways of using drugs to manage heart disease, cancer, asthma, depression and many other common diseases.

Against this backdrop, it is safe to argue that the management and dispensing of medicine, produced through pharmacogenomic and pharmacogenetic research, will pose a new set of challenges to pharmacists, and in particular, hospital and institutional pharmacists. This is because it is expected that the treatment and management of disease with medicines developed using these fields of study will invariably be initiated in the hospital setting during the first stages of the implementation of this new form of medicine.

It would perhaps be worthwhile for hospital pharmacists to become acquainted with these new technologies and to make constructive contributions during the development process, so as not to lose our place as custodians of medicines, regardless of whether or not they are genetically specific.