



# Biotechnology influencing pharmacy: a perspective

DR HASAN MAHMUD REZA

**I**f you really want to understand what's going on in a disease, you have to look at the proteins," says William Rich, a biotechnology firm CEO. In the past three decades, some wonderful inventions of technologies collectively known as 'biotechnology' have contributed a lot in better understanding of genetics. Biotechnology is now considered as an important and infinite reservoir for new, innovative and targeted drug. Biomedical research based on genetic information will be continued to find better, safer and more cost-effective drug in future. Current post-genomic era will obviously change the way of treatment and biotechnology medicines will be the drug of choice in near future. To keep pace with such change in health care system, pharmacy students should be adequately prepared to face the new challenges as pharmacists are known as 'drug-expert'.

## Contributions of Biotechnology to Pharmaceuticals

Currently about one-third of more than 1000 medicines in human trial are biotechnology medicines. Already, we have a good number of biotechnology medicines commercially available in the world market. These medicines are being used for the treatment of acute myocardial infarction, sclerosis, hemophilia A, rheumatoid arthritis, anemia, infertility, diabetes, cystic fibrosis, chronic hepatitis C, AIDS, cancer etc. Biotechnology enables to modify naturally occurring molecule to confer therapeutic value as medicines. An example is the interferon. This protein is altered to prevent it from being eliminated from the body too rapidly, enabling it to suppress the virus longer.

Biotechnology facilitates the discovery of new drugs with novel mechanism of action for diseases that were previously difficult or untreated. It has contributed a lot in the diagnosis of diseases in genetic level. About 400 genetic disorders in humans are caused by defects in single genes. Companies are also putting much attention in cloning of individual body cells, tissues and genes into biotechnology medicines that are expected to be safer and more effective than conventional medicines. To undertake a rational drug design study, a structure for the



target receptor is required. Biotechnology can provide this target receptor. Scientists are trying to set up more improved and adaptable techniques that will lead to new, safer, and cost-effective life-saving pharmaceuticals to combat even the undefined disease.

After the announcement of human genome sequence, the scientists are figuring out what protein the gene encodes and what function a protein does in the body. Pharmaceutical and biotechnology companies are investigating to learn about the proteins and their interactions in causing disease. Pharmaceutical researchers have selected about 500 targets, which is expected to be 10,000 within a couple of years. As more targets are distinguished and much information about the involvement of these targets is at hand, it will be easy to develop better and more precise drug for treatment of diseases. In the current century, we will need more people with biotechnology expertise to drive the research for finding new and better medicinal agents.

## Status of Available and Forthcoming Biotechnology Medicines

At present, 76 biotechnology medicines are approved by the Food and Drug Administration (FDA). A survey conducted in

2000 by the Pharmaceutical Research and Manufacturers of America shows that 369 biotechnology products are in the pipeline and undergoing different phases of clinical trials. These medicines target more than 200 diseases, including AIDS, cystic fibrosis, heart diseases, diabetes, hepatitis, Parkinson's disease, Alzheimer's disease, asthma, cancer, arthritis, tuberculosis, and sickle cell disease. About 175 medicines are for cancer; 39 medicines are for infectious diseases as hepatitis, genital herpes, urinary tract infections, sepsis and 19 medicines for autoimmune diseases.

These biotechnology medicines are glycoproteins, colony stimulating factors (CSFs), enzymes, hormones, monoclonal antibodies (Mabs) and vaccines. Many of these biotechnology medicines have significantly removed the patients' sufferings, and because of that, a huge number of AIDS patients are hoping to have longer and normal life.

## Promise of Biotechnology to Health Care

The 21st century is considered as the 'platinum age' of medicine. It was estimated to invest more than \$30 billion in R&D in 2001 alone. All these efforts on genetic research will enable scientists to develop more effective medicines. This century is called 'the

century of biology'. Dr. George Poste, a distinguished pharmaceutical researcher, hopes that this century will also be the 'century of cures' as pharmaceutical companies take aim at the increasing number of targets or genes for medicines.

## Pharmacists with adequate knowledge of biotechnology will have wider scope to play role in future drug development

The present world has become free for all. People have the option to move around the world to find the better scope not only to pursue their career but also to serve the humanity in the best possible way. The ultimate goal of research in bio-science is to find the way to improve the quality of life for patients and to ensure good health for all. Therefore, the development in health care system will be given the top priority as usual.

Biotechnology has already established itself as the driving force in pharmaceutical development; biotechnology medicines will continue to influence on the drug discovery process. There is no controversy over the notion that pharmacists will find a limitless scope if they really prepare them-

selves to work in biotechnology based companies.

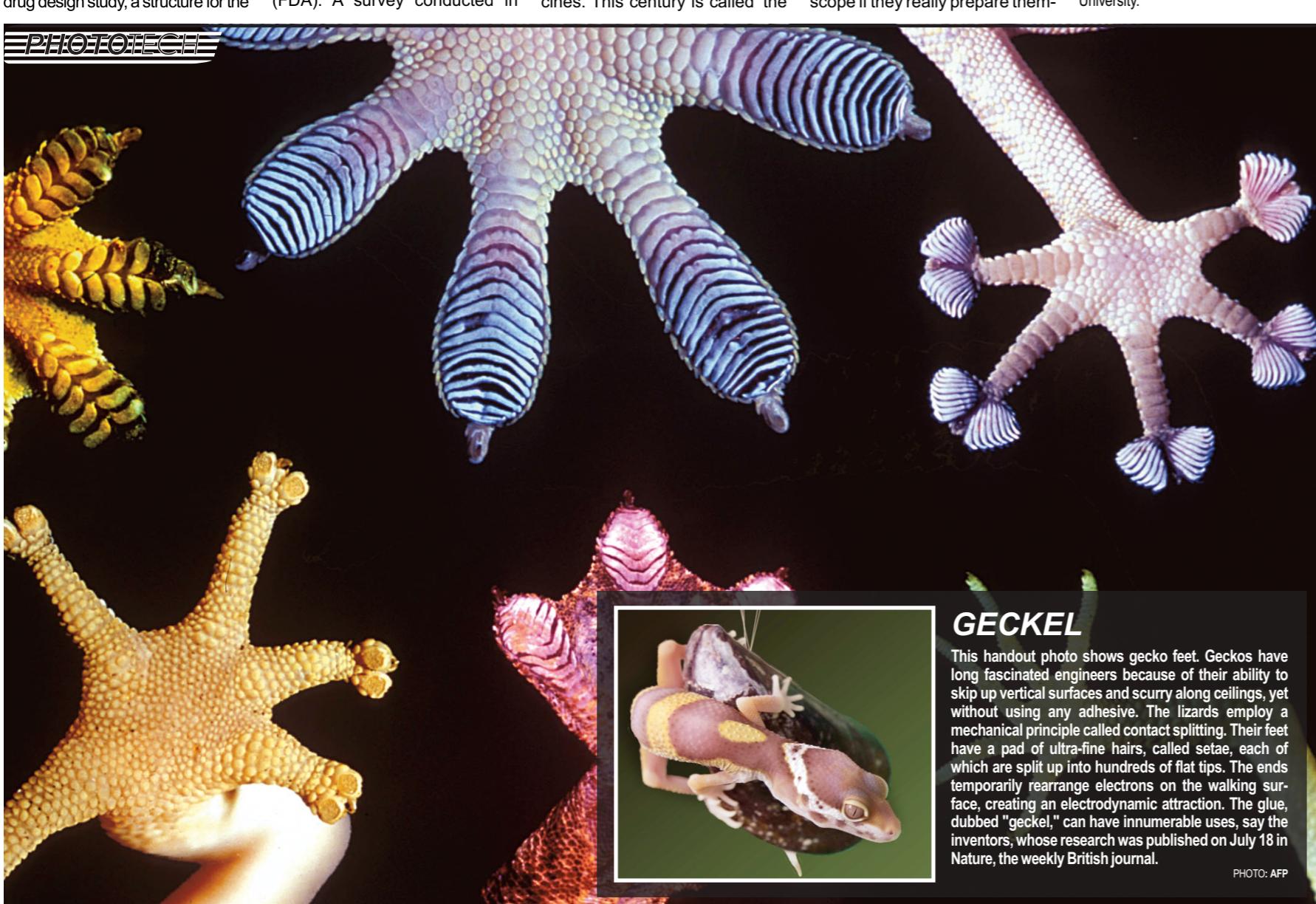
In Bangladesh, pharmacists are yet unable to contribute to drug development due to lack of opportunity. However, this area could be a right choice for many enthusiastic pharmacy graduates and actually, there are handful scopes waiting outside Bangladesh. In the current age of globalization, we never expect that our pharmacists will find their jobs only in Bangladesh. By ensuring a proper education as demanded by various nature of pharmacy profession, our graduates who find scopes for higher study in such technology-based subjects in abroad will be benefited tremendously. They will have options to work in biotechnology based pharmaceutical companies. On the other hand, this will eventually allow a country to increase science experts. When there will be sufficient experts in respective fields, even local pharmaceutical companies will step forward to setup their biotechnology based production units where our pharmacists can take over the full charge. Reasonably, pharmacy students must possess sufficient knowledge to achieve this goal. As an effective measure, it is the time possibly appropriate to revise the conventional pharmacy syllabus in Bangladesh; a careful incorporation of pharmaceutical biotechnology dealing with basics of currently emerging technologies will surely ensure a quality education.

Bangladesh is currently considered as the most promising developing country in south-east Asia for many reasons. This country has the potentiality to be an industrial as well as an agricultural power. Unfortunately, expected progress has not yet been made; the serious problems of this country are the political instability, nationwide corruption, poor law and order situation, and lack of well-formed infrastructure. We hope situation will change soon.

As a pharmacist, I wish that quality education in pharmacy will be assured in respective institutions, which will generate competent pharmacists who will be able to contribute significantly to the worldwide health care system.

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## PHOTOTECH



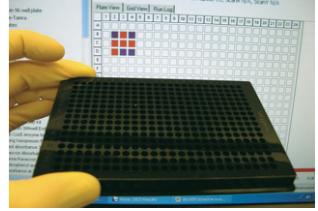
### GECKEL

This handout photo shows gecko feet. Geckos have long fascinated engineers because of their ability to skip up vertical surfaces and scurry along ceilings, yet without using any adhesive. The lizards employ a mechanical principle called contact splitting. Their feet have a pad of ultra-fine hairs, called setae, each of which are split up into hundreds of flat tips. The ends temporarily rearrange electrons on the walking surface, creating an electrodynamic attraction. The glue, dubbed "geckel," can have innumerable uses, say the inventors, whose research was published on July 18 in *Nature*, the weekly British journal.

PHOTO: AFP

## DNA computing

**DNA computing** is a form of computing which uses DNA and biochemistry and molecular biology, instead of the traditional silicon-based computer technologies. DNA computing, or, more generally, molecular computing, is an exciting fast developing interdisciplinary area. R&D in this area concerns theory, experiments and applications of DNA computing. This field was initially developed by Leonard Adleman of the University of Southern California. In 1994, Adleman demonstrated a proof-of-concept use of DNA as a form of computation which solved the seven-point Hamiltonian path problem.



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## TECHVIEWS

### Online reservation must for boosting hotel business

MOHAMMAD SHAHIDUL ISLAM

THE internet has revolutionised our lives from the way we correspond to how we accomplish business in a quicker and more well-organised way. Online hotel booking is one of the many advantages the internet rains down on us.

We can surf the web for hotels by exact terms and conditions. For example, if a person is in a country on a business tour for the first time, they may want the hotel location close to or near their meeting or office address in a bid to save time and money on commuting. People on pleasure trip, on the other hand, may look for a city's tourist attractions first, and choose hotels accordingly.

Location is important, no matter whether guests or tourists are on business or pleasure trips, and all the hotels listed online will provide them with the approximate distance from the city's major points of interest such as the airport, railway station, downtown and tourist spots.

Hotel websites allow a guest to check the rates and accessibility and to make sure that the hotel is within their price bracket. It is particularly important whether people are holiday travellers or on a tight office budget. Online information also allows them to check and compare hotels in terms of location and price range they specify, so they can decide if the quality and facilities offered, as well as the rates, are ideal for their purpose and budget.

Most online-listed hotels in the world today provide a virtual tour or pictures of the rooms, suites and other facilities such as the restaurant or coffee shop, spa or fitness centre, reception area, as well as bars and lounges. This will help guests and tourists know in advance what to expect of their rooms, as well as of the hotel, because most descriptions without photographs sound good in writing, but often disappointing once people check in.

Online booking is a few clicks away from anywhere in the world with access to the

internet. With a simple search on Google or another search engine, a person can easily get an entire list of hotels in the city or town of their choice, usually listed according to their ratings or reviews and amenities available.

However, if they want to narrow down their search even further, they can do so by keying in location or price range.

Booking a hotel room, if available, can be done instantly. People will need a credit card to reserve their accommodations. Most hotels also offer multilingual pages, making it easy for people of different tongues to access the information.

Online hotel booking is the easiest and most efficient way to get the best possible hotel in any given city without having to make a phone call or knowing anything about the city. No

matter whether a person is on vacation and so has the time to delve into a location in advance, or on business and have to visit a city in a day's notice, they can find the right hotel with the help of the internet.

The hotel industry is experiencing a boom across the world. The wave has also struck our shoreline. A plethora of new hotels -- some are coming soon -- have opened in Dhaka, Chittagong, Sylhet and Cox's Bazaar. But we are not yet aware of the blessings without photographs sound good in writing, but often disappointing once people check in.

Online booking is a few clicks away from anywhere in the world with access to the

The internet has also made the hotel industry more competitive as people can compare hotels for location, amenities and prices before they make the decision. So a person can usually get great bargains online, no matter whether it is a last-minute booking or made well in advance. The internet has provided the consumers with many options to select and book a hotel at a reasonable price in the right location at any time, day or night. It's high time Bangladesh entered the network.

The author is a faculty of National Hotel and Tourism Training Institute Bangladesh Parjatan

## TECHNEWS

### HP lauds 'innovation'

EDWARD APURBA SINGHA

HEWLETT-PACKARD (HP) Imaging and Printing Group organised a seminar -- HP Technology Leadership Seminar -- at Radisson Water Garden Hotel on July 17. The aim of the seminar was to update the customers on the giant's latest innovation.

HP believes that innovation is at the core of its unprecedented success, making it one of the key players in hardware manufacturing. Besides, the company always takes a sensible approach to weigh up customer needs, complexities and aspiration, combination of which enables it to come up with more dynamic solutions.

High-level HP officials at the seminar shared their expertise with the customers. More than hundred corporate customers showed up in the pleasing event. Mr Paul Anthony, general manager (AEC & Singapore), HP Imaging and Printing Group, gave the opening speech where he assured the customers of the highest level of support on the company's behalf.

Mr William See, country sales manager (AEC), and Mr Albert Seah, market development manager (AEC), HP Imaging and Printing Group, described the inventions that the giant has incorporated in its products to offer customers the best value for their money.

HP is the largest manufacturer in IT equipment in the world, earning US\$92 billion-plus revenue in 2006. It is ranked number one in mono and colour laser printers, scanners, large format printers, print servers and ink and laser supplies. The giant has supplied over 525 million printers

its printers to generate more lively output. HP's printers use unique print languages in the device drivers, which reduce the load on the office network and deliver, using HP ImageREt Technology, output much faster with superior print quality. The company's inkjet print-



ers, which use HP PhotoREt technology, can deliver up to 1.2 million directly printable colours -- the highest in the industry. HP recommends using right paper to achieve the best quality output. In order to sort out fake products HP offers online verification service to its customers.

HP has now developed the universal printer driver that will liberate customers from the hassle of driver upgrade. As the name implies, this driver is compatible with both old and new printers. In addition, HP has also put new technology in