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Tissue engineering key to cures

TECHNOLOGY PARK MALAYSIA

By Dr Ahmad Ibrahim

ORGAN transplant is now a routine medical procedure. However, there is no guarantee that the transplant will not be rejected by the body. Cases abound of transplanted organs being incompatible despite using drugs to neutralise rejection.

However, there is good news. Recent breakthroughs in medical science, especially in tissue engineering and regenerative medicine, show that it may not be long before one can grow one's own organ to replace diseased parts. Animal studies have confirmed that organ rejection may soon be a thing of the past.

There is no doubt that tissue engineering and regenerative medicine is an emerging technology area set to revolutionise the global healthcare industry. It has the potential to restore, maintain and enhance tissue and organ function.

In the therapeutic application, tissues can be grown in a patient or outside the patient for transplantation.

Tissue engineering can also have diagnostic applications where the tissue is made in vitro and used to test drug metabolism and uptake, toxicity and pathogenicity. Once perfected, animal testing for drug may soon be a thing of the past.

In Malaysia, the subject of tissue engineering is still in its infancy. But the future promises lucrative opportunities for business.

On Feb 26, Technoloy Parks Malaysia (TPM) played host to a technology business innovation forum deliberating on the challenges and opportunities of tissue engineering.

Speakers invited for the forum represent both the research, academic and business community. They shared their experiences in this exciting technology area.

The life expectancy of man has increased and this is mainly due to the enormous progress in medicine over the past three decades. There is no doubt that novel pharmaceutical products have been to a significant extent responsible for the marked increase in life expectancy.

Despite that, those in the pharmaceutical business readily admit that suitable treatments only exist for only one-third of the 30,000 or so known diseases afflicting mankind. There is still the need to resolve the cure for the remaining 20,000 ailments.

Many, for example, yearn for vaccines against malaria, tuberculosis or HIV/AIDS.

Or for that matter, we have yet to develop a painkiller that has no uncalled for side-effects.

In the case of HIV/AIDS, though definite cure has yet to be found, patients' survival potential has been dramatically enhanced thanks to the availability of new drugs. This would also not have been possible without the extensive research efforts of the pharmaceutical industry.

The question is, why is it not possible for the same rate of progress to be repeated to find solutions to more recent health issues?

According to Dr Andreas Barner, Chairman of the German Association of Research-Based Pharmaceutical Companies, there is no truth to the claim that there is something blocking the pharmaceutical industry's innovation pipeline.

On the contrary, he has maintained that the research findings of recent years have on many occasions demonstrated how seemingly incurable ailments suddenly became responsive to medical treatment from the moment such diseases could finally be explained in terms of molecular interactions. This has opened the door to more targeted therapies.

A good example is a cancer drug designed to weaken or destroy the key molecular structure of a cell implicated in a certain diseased state. Such breakthrough would pave the way for therapy with fewer side effects. The vaccine developed against cervical cancer is another example.

Admittedly investments in drug development is high in terms of time and costs. It takes for example an average of twelve years and €600-800 million to fully develop a new drug. Such high costs have not stopped pharmaceutical companies from investing in research.

Drug discovery is fraught with risks. The record shows that only one in 10,000 investigated candidates finally made it to the market. However, biotechnologists agree that a better understanding of how diseases develop at the molecular level offer new opportunities for developing highly specific drug ingredients.

The road from a simple chemical molecule to a product on the shelf of the local pharmacy is long and arduous, writes Birgit Niesing of Germany's Fraunhofer Institutes.

However, new research findings and technologies will help shorten the journey and make it safer.

The latest results of stem cell research at the Fraunhofer Institute for Cell Therapy and Immunology will pave the way to new forms of therapy which will one day lead to better treatment for diseases such as cancer, stroke or malaria.

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