Our Picks

Asian Biotech Innovations to Watch in 2015

From the lab to the market

From 3D printed bones to smart shoes that buzz you to your next destination, Asian biotechnology innovations are making their impact in a wide range of applications. Yamini Chinnuswamy highlights ten of the hottest products to look out for in 2015. Remember, you read it here first!

1. Healing Nanogels

Forget bandages and silicon dressings: nanogels might be the future of wound healing. Scientists from Singapore’s Institute of Bioengineering and Nanotechnology have designed short strings of peptides that self-assemble into a fibrous gel when water is added. The nanogels were shown to heal burns more quickly compared to conventional wound dressings. Accelerated wound healing is crucial to minimizing the risk of infection and scarring, both of which are common problems faced by burn patients.

The nanogels may someday be used as a topical gel, spray, membrane patch or long-lasting dry-powder formulation.

2. 3D Printed Bone

A popular item in Japanese cuisine, seaweed may now have uses beyond the kitchen. Researchers at the University of Wollongong in Australia have developed a nifty 3D printing device that can “draw” new bone using a seaweed-derived alginate ink.

The BioPen device allows surgeons to inject a mixture of alginate and bone cells directly to the site of injury, regenerating new tissue.

The BioPen has already been used to successfully grow cartilage in animals.
Sickle cell disease, where abnormally shaped blood cells have a diminished ability to carry oxygen, causes over 20,000 deaths each year. Diagnosing the disease requires expensive equipment and trained personnel, both of which are often lacking in rural areas. Researchers from the Indian Institute of Technology, Bombay, have developed a microfluidic device to help in the diagnosis of sickle cell disease. The microfluidic device preserves blood samples in deoxygenated conditions. If a patient has the disease, their cells will adopt the eponymous sickle shape. Using a mobile device-based app, healthcare workers can make a quick diagnosis and send the patient for treatment.

Artificial antibodies
The majority of antibody drugs in clinical trials today have complex structures and high molecular weights, making them costly to manufacture. Researchers at the Korea Advanced Institute of Science and Technology (KAIST) have made a simpler version of an antibody, called a repebody. The artificial antibodies have a simpler structural backbone fused to a protein binding domain and can be mass produced in bacteria. In a mouse model of non-small cell lung cancer, repebodies bound to their interleukin-6 target, leading to a reduction in tumor load.

Gene scissors
Imagine being able to ‘cut-and-paste’ any genetic sequence at will, even in living organisms. Thanks to a Korean company called Toolgen, we can now use genetic editing technology to ‘snip’ out desired stretches of DNA. The gene editing process first introduces double-stranded breaks in diseased genes, before replacing them with good copies of DNA. Toolgen is now working with a Korean university to increase biofuel yield from microalgae.

30-minute Ebola test
In the near future, diagnosing Ebola—a highly dangerous viral disease—may take as little as 30 minutes and only require a small, battery-powered warmer. Researchers from Nagasaki University in Japan are collaborating with colleagues from Eiken Chemical to develop an Ebola virus detection kit. The kit uses short DNA sequences called primers to amplify DNA unique to Ebola. Patient samples turn cloudy if the virus is present, providing a simple visual cue for the virus. The team is currently exploring industrial collaborations to make their technology available in Ebola-stricken countries.

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Wearable solar cells

Chinese researchers at Fudan University have developed a new technology that can turn our clothes into walking solar batteries. The ‘solar cell fabric’ has already been used to power an LED light.

Thread-like solar cells that can be woven into textiles aren’t a new idea, but previous versions were inflexible and costly to produce.

Instead of making wire-shaped cells, researchers decided to stack the components, layering a titanium electrode filled with light-absorbing dye over a carbon nanotube counter electrode.

The new wearable solar captures incident light at multiple angles and works well when bent, allowing them to be easily integrated into knitted fabrics.

Portable DNA sequencer

DNA sequencing plays a major role in the diagnosis of deadly diseases, but conventional sequencers are bulky and not portable.

Researchers at New Zealand’s University of Otago have now developed a handheld DNA sequencing device capable of running for up to six hours on batteries.

Freedom4 processes DNA samples in a single step and can be used to detect bacterial and viral infections within an hour.

Thanks to these advances in technology, forensics labs can finally experience speedy DNA identification, much like that seen on television shows such as CSI.

Smart shoes

What if you could tell your phone your next destination and let your shoes lead the way?

Indian start-up Ducere Technologies has developed Bluetooth-enabled shoe technology that uses Google maps to help wearers navigate.

Called Lechal shoes, the technology was originally designed to help visually impaired individuals achieve mobility.

Developers realized, however, that the shoes—named for the Hindi phrase “take me along”—could also be useful for tourists in a new country, or joggers along their running paths.

The World Health Organization estimates that most of the world’s 280 million visually-impaired people live in developing countries such as India.

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Polymer tooth spray

Bad breath, or halitosis, isn’t just socially awkward, it is also a medical problem.

To remove the bacteria in the oral cavity, people usually resort to a combination of vigorous mouth cleaning, dietary changes or probiotic intake.

But the solution to halitosis may lie in seafood. A Taiwanese company called Toothfilm Biofilm Innovation has developed a breath freshener from chitosan, which is extracted from the exoskeleton of crustaceans.

T-Spray, as it is called, kills bacteria and removes plaque build-up. It purportedly also helps to re-mineralize tooth enamel.

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