New horizon in treating cancers

A ground-breaking treatment to beat cancer drug resistance

Scientists are about to crack a hard problem in treating cancer. Multidrug resistance is a critical cause of treatment failure but no real solution has been available. When cancer becomes resistant to drugs, the patient stops responding to treatment and develops a more aggressive form of cancer. Scientists at The Hong Kong Polytechnic University have developed a new drug to target a common drug-resistance protein and break down the natural defence of cancer cells. The new drug will be used alongside standard cancer treatments to improve survival rate, bringing new hope to patients with advanced form of the disease.

We are one step closer to a revolution in treating cancer. As a critical reason for cancer treatment failure, drug resistance remains one of the biggest challenges. Scientists at The Hong Kong Polytechnic University have found a new way to kill cancer cells that have stopped responding to standard therapy.

According to recent cancer research, drug resistance in cancer is partly blamed on a protein called Permeability Glycoprotein (P-gp), which turns on the cell defence and stimulates further growth of cancer cells. The existence of the P-gp protein causes membrane of cancer cells to develop tiny holes. Cancer researchers at the Department of Applied Biology and Chemical Technology went after the drug-resistance protein P-gp and developed a reversal agent to block the development. The new drug called P-gp inhibitor kills cancer by blocking unintended leakage of drugs. Design of this new P-gp inhibitor is based on the dump bell shape of P-gp protein, Dr Larry M.C. Chow’s group designed a P-gp inhibitor to fit snugly into these tiny holes and plug the leak so that higher levels of chemotherapy medicine can stay in the tumour. It is expected that the new drug will be used in combination with standard cancer treatments to produce a much more effective therapy.

New treatments are badly needed to overcome drug resistance. Dr. Chow explained, “When cancer cells
become resistant to treatment, defiant cells grow and multiply in an uncontrolled manner, causing the cancer to spread and it becomes more difficult to treat. Patients stop responding to treatments have little options except aggressive chemotherapy. It is exciting to see anti-drug resistance treatment becoming a reality.”

The novel drug comes from the nature. The P-gp inhibitor is made out of Apigenin, a natural nutrient found in many fruits and vegetables such as parsley, celery and chamomile tea. The research team led by Dr. Chow has successfully transformed Apigenin into Apigenin Flavonoid Dimer that can bind to cancer cells really well.

Pre-clinical tests in mice have shown striking results. When used in combination with Apigenin Dimer, existing cancer treatments were found to have killed far more cancer cells than otherwise. “It is very encouraging to discover that P-gp inhibitors can be used to extend the usefulness of cancer drugs by preventing drug resistance. This important research reveals a new approach to designing drugs that will ultimately increase the chance of success and improve survival rates,” Dr. Chow added. The next stage is to develop P-gp inhibitors further and run clinical trials to see if they are safe and effective, according to Dr. Chow.

Just a tiny dose will produce remarkable healing effects. Furthermore, the high potency drug is hardly toxic or harmful. The modified Apigenin molecule will only target the tumour, and not cause damage to normal tissue. In other words, there will be virtually no side effects to the rest of the body.

Bringing new hope to fight persistent cancers, the breakthrough has already swept a number of international awards including a Gold Medal at the 41st International Exhibition of Inventions of Geneva, a Special Award at the Romanian Delegation 2013 and a Silver Award at the 6th China International Invention Exhibition.

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