Researchers work to bridge the gap between Chinese and Western medicine

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When it comes to minor complaints, chronic conditions and even fatal illnesses, we often turn to ginseng and other herbal remedies. That is why traditional Chinese medicine has become an integral part of our life. But how many of us really know the effectiveness of these Chinese medicines from various sources?

A team of scientists from The Hong Kong Polytechnic University (PolyU) has been working on a new approach to drug development involving chemistry, biotechnology, mathematics, computer power and 5000-year ancient practices in Chinese medicine. The groundbreaking regime for herbal study and testing called quantitative-pattern-activity-relationship ("QPAR" in short) verifies the quality and health benefits of traditional herbs. While Western pharmacology focuses on purified chemical compounds such as Vitamin C, Prof. Chau Foo Tim from the Department of Applied Biology and Chemical Technology and Dr Daniel Sze from the Department of Health Technology and Informatics studied the impact from a mix of compounds, a unique property in herbs.

"Information-rich pattern called chromatographic fingerprint were used to prove the authenticity of a medicinal plant. Our research team has further utilized the 'big data' three dimensional (3D) fingerprints to give a good presentation of active ingredients and bioactivities that allow scientists to excavate any healing power from a mix of compounds," said Prof. Chau.

To further bridge the gap between Chinese and Western medicines, Prof. Chau and Dr Sze have been working on a completely new drug classification and rating standard to establish a scientific link between traditional herbs and various diseases. The new QPAR standard for the first time links medicinal properties to cells, genes and proteins that trigger or contribute to a disease. For example, the magic fungus Ganoderma (□□) could be investigated for its ability to improve immunity by stimulating Dendritic Cells and therefore cell-mediated immune responses in our body.

"This is an innovative framework that quantifies the effect of traditional herbs would have on human health and common diseases on a sound scientific basis. QPAR can be used to verify how well Ganoderma can boost immunity and give a rating," said Dr Sze.

The research is still at an early stage but if successful, scientists will only have to do laboratory tests and crunch on computers to build databases, and get an accurate projection of active ingredients, efficacy and toxicity for preliminary herbal study in the future.

Another breakthrough is that QPAR uses mathematical methods to make predictions and the sophisticated algorithms tapped into 5000-year ancient system of Chinese medicine which was based on the flow and balance of positive (yang) and negative (yin) energies in the body. "We believed that blending the Chinese understanding of diseases into the western medicines would yield an approach more successful in unlocking the full potential of Chinese herbs," Dr Sze continued.

Dr Albert B. Wong, the founding president of the Modernised Chinese Medicine Association who was also a member of Hong Kong SAR Government's Panel on Promoting Testing and Certification Services in Chinese Medicine Trade, shared his views on this novel technique. "Health benefits of herbal remedies are widely known but not yet

proven. People don't want to waste money or gamble on unproven treatments and then miss the chance of beating the diseases. New innovations are needed to bring transparency and credibility into herbal medicine."

Dr Wong also believed that this innovation would drive the evolution of herbal trade. "Herbs can be grown, hand-picked or collected. The quality of active ingredients and medicinal effects also varies with region, altitude, growing techniques and processing methods. QPAR provides a scientific way to quickly verify the authenticity and active ingredients by different sources, making herbal trade fairer and more transparent. Drug companies would better control the prices and quality of raw herbs and also enforce standardisation and consistence across products. From the consumers' point of view, it is worth to spend the money on products that can give exactly what they want for their health benefits."

The unprecedented level of transparency will benefit the whole medical community. Practitioners of Chinese medicine, for example, can evaluate herbs more accurately and thus choose the most effective medication. Today, over three hundred herbs are commonly being used. It would be a long way before they become mainstream medicines. Drug discovery research is a long game which is expensive, complicated and time-consuming. QPAR could be a reliable and a relatively effective and efficient tool for pre-clinical funnelling so that scientists can narrow down the best plant candidates that warrant close scrutiny before clinical studies and applications. With PolyU's novel QPAR technique, the science of Chinese medicine will certainly move forward at a pace much faster than before.

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