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"Chinese herbal medicine's rich history has withstood the test of time to retain relevance and value in the 21st century. With modern advances in science and technology, what can we do as herbal medicine practitioners to ensure the practice forges into the future?"

In recent years, our news cycles and popular culture alike have been captivated by the story of Elizabeth Holmes, the founder and CEO of Silicon Valley's now-defunct Theranos, a company that bilked prominent venture capitalists of hundreds of millions of dollars before going belly up. Theranos pitched a technology that had the purported potential to give every American within driving distance of a Walgreens access to an unprecedented amount of their own personal health data. The company's minimally invasive machinery for drawing and analyzing blood was a scam—it never, in fact, existed—but the real allure of Theranos was the vision it offered: better health outcomes for the individual resulting from a personalized healthcare plan based on one's own unique medical data.

So what does the decade's biggest fraud to fall from *Forbes Magazine's* grace have to do with Chinese herbal medicine, much of which was first documented in print nearly two thousand years ago? The same 21st century buzz that amplified interest in Holmes' would-be industry disruptor presents an opportunity for herbal medicine to strike a culturally relevant chord with scientists, healthcare providers, and patients in 2019 and beyond. It is the promise of personalized medicine.

Personalized, or precision, medicine relies on recent breakthroughs in gene research and data mining to tailor diagnosis and treatment of disease to a person's unique biochemistry, rather than treating all patients suffering from a similar disease identically.¹ For instance, personalized medicine can identify mutations that might make a particular drug more toxic to one individual, or indicate which drugs will be most effective in treating another's cancer. Targeted medical therapy is seeing a surge in interest from the scientific community, while patients are starting to reap its benefits. In his 2015 State of the Union address, President Obama announced a program called the Precision Medicine Initiative, saying, "I want the country that eliminated polio and mapped the human genome to lead a new era of medicine—one that delivers the right treatment at the right time."²

Sound familiar? Zhang Zhong-jing, whose Han Dynasty prescriptions are still considered the classic herbal formulas of TCM, delineated the principle of *bian zheng lun zhi*, or "treatment based on syndrome differentiation," back in the 3rd

¹Fran Smith, "How personalized medicine is transforming your health care," January 2019, <https://www.nationalgeographic.com> (accessed April 2019).

²Sara Reardon, "US precision-medicine proposal sparks questions," January 22, 2015, <https://www.nature.com> (accessed April 2019).

century. It remains the paradigm for disease management in Chinese clinical medicine. This highly personalized approach to healthcare, with differential diagnosis as its foundation, has been one of the great strengths of Chinese herbal medicine throughout its rich history. Chinese herbal practitioners have *always* personalized their treatment plans based on how a disease is manifesting in a given patient's body at a given time, factoring in his or her constitution, environment, and even time of the year.

Personalized medicine also highlights a shift to an emphasis on early disease intervention and even proactive, individualized disease prevention—until now, an anomalous approach under the mainstream medical model. By contrast, TCM is predicated on treating an individual patient's disease pattern, often subclinical by Western standards, and bringing the body into harmony so that it can best heal itself. As herbal medicine practitioners, we can expect that our patients will be increasingly galvanized to seek out personalized medicine, as its improved outcomes continue to make headlines. Here, the onus is on us to take an active role in educating our patients about how TCM diagnosis and formula prescription by their nature provide individualized support, with a focus on wellness, not just disease treatment.

How, then, do we ensure that Chinese herbal formulas are best situated to be incorporated into tomorrow's personalized treatments, not only in traditional clinics but integrated medical settings? First, Chinese herbs must be included in current research being done on disease biomarkers and synergistic drug interactions, which are key to precision drug therapy. We now know that many of the mainstays of our pharmacopeia have varied therapeutic effects and target multiple pathomechanisms—making them uniquely suited to address chronic diseases with multifactorial complications.³

For instance, Wang et al. argue that “[t]he discovery of new highly sensitive and specific biomarkers for early disease detection coupled with the development of personalized TCM therapies holds the key to the future treatment of complex diseases such as cancer.”⁴ In a clinic, this has the potential to look like patients receiving personalized herbal or integrative medicine—including preventative medicine—that factors in their own particular genetics and biochemistry. As Yun et al. explain, “...it is now possible to examine the precise molecular targets impacted by TCM preparations.... Ultimately, this can lead to a more evidence-informed

³Nikolas Ekow Thomford et al., “Personalized Herbal Medicine? A Roadmap for Convergence of Herbal and Precision Medicine Biomarker Innovations,” *OMICS A Journal of Integrative Biology*, Vol. 22 No. 6, 2018: 380.

⁴Xijun Wang et al., “Systems Biology Technologies Enable Personalized Traditional Chinese Medicine: A Systematic Review,” *The American Journal of Chinese Medicine*, Vol. 40, No. 6, 2012: 1117.

practice of TCM that can in the near future account for individual and population variability in these molecular TCM targets.”⁵

Simultaneously, there is also public relations work to be done around the image of Chinese herbal medicine and its contemporary scientific relevance. Promotion of Chinese herbs can feel fresh—and scientifically credible—if we speak to the zeitgeist of personalized medicine. We have an opportunity now to redefine our “back to nature” medicine not as simplistic and unsophisticated, but, on the contrary, as particularly powerful because it relies on complex phytochemical synergies, which are often better able to address complicated illnesses than single drugs. We can cite and build upon the growing number of clinical studies of Chinese herbs that demonstrate their efficacy while explaining “how they work” in terms of Western science.

Chinese medicine has never had a one-size-fits-all approach to treatment. As modern advances in science and technology make it possible to paint a highly individualized picture of a patient’s health data, our herbal medicine is already ripe for this revolution in mainstream healthcare. By centering Chinese herbal therapies in precision medicine studies and trials, “the right treatment at the right time” might as likely be from our materia medica as from a synthetic standby. Such an approach promises a future for our patients—and our medicine—that is well worth investing in.

⁵Hongmin Yun et al., “Genomics and Traditional Chinese Medicine: A New Driver for Novel Molecular-Targeted Personalized Medicine?” *Current Pharmacogenomics and Personalized Medicine*, March 2012: 3-4.