Straight talk with… Chen Zhu

Before becoming China's Minister of Health in 2007, Chen Zhu had witnessed a wide contrast in medicine within his homeland. When he was sent to the countryside and worked as a 'barefoot doctor' during the Cultural Revolution, he saw the need for basic care in rural regions. As a researcher, he helped reveal the mechanism through which all-trans retinoic acid and arsenic trioxide—a compound used in traditional Chinese medicine for more than two millennia—can radically improve standard care for acute promyelocytic leukemia (APL).

In April, Chen and his mentor, Wang Zhen-yi of the Shanghai Jiao Tong University School of Medicine, received the Albert Szent-Györgi Prize, a $25,000 cash award from the Washington, DC–based National Foundation for Cancer Research, in recognition for their work on APL. ON that occasion **Victoria Aranda** and **Roxanne Khamsi** asked Chen about his plans for cancer research and for improving stem cell regulation in China. A condensed version of that interview follows.

What does the example of APL teach us about translational medicine?

After the clinical success [with APL], we were interested in the molecular and cellular mechanism of the treatment: differentiation induction therapy. Arsenic trioxide works on the patients who have relapsed after retinoic acid, suggesting that [the molecules work through] different mechanisms. After many years of work, we realized that if we are talking about targeted therapies, then this is typical of synergistic targeting.

I think that if we go back to history, then first of all there are different approaches to treating cancers. Killing—chemotherapy, a cytotoxicity approach—is still a useful approach, but, on the other hand, targeted therapies should also be very important, such as differentiation therapy. They must be targeting the leukemia stem cells; they must target the focal point involved in the leukemogenesis network

How can we find targets to extend this idea, making malignant cells into benign cells, to other cancers?

The contribution of cancer genomics can be to identify more targets. So, by combining both chemical biology and genomics and systems biology then in the future, more effective drugs or therapies should be able to be found.

How do you envision incorporating personalized medicine in the clinic?

The story of APL tells us that actually the use of biomarkers should be very important for the right person to choose the right drugs, because retinoic acid and arsenic work very well in APL but unfortunately not in other [types of leukemia]. [Sequencing for such mutations] is routine practice in some big cancer centers in China, already. In the future, we need to improve the guidelines for cancer diagnosis and treatment by using useful biomarkers as much as possible.

How is your research in cancer informing your decisions about how much a drug should cost?

It's a difficult question. As a minister of health with limited resources in a developing country of 1.3 billion [people], we should also be very prudent of the selection of drugs in our essential drug list. A very expensive drug [might] allow a prolongation of maybe just two or three months. I don't mean that we shouldn't consider the use of expensive drugs that allow just a few months of life. But, for example, in China we have so many children with major diseases, such as congenital heart disease or childhood leukemia. And for childhood leukemia, the treatment is very effective. Eighty percent of the children who have acute lymphocytic leukemia are curable, so I have to balance [that]. It's not easy.

What do you see in terms of the challenges for drug manufacturing in China?

We need to encourage innovation of the drugs, but I think we should pay more attention to the use of the generic drugs. The Chinese pharmaceutical industry is developing quite rapidly, particularly since the healthcare reform [of 2009], because the needs are there. Before [health care reform in China], many patients didn't see a doctor because of a lack of the means to do so. Now there are more and more people who go to the doctor when they are sick. That means there's a huge demand for medical services, but also a huge opportunity for the pharmaceutical industry.

The US Food and Drug Administration is expanding its reach of monitoring drug manufacturing. What is China doing to make sure drugs are reliable?

Of course quality should be the most important thing. China is upgrading the GMP [good manufacturing practice] standards for most of the drugs, particularly for the injectable drugs. Last year the new version of the GMP was issued; I'm sure that will allow a higher quality of the drugs [to be] manufactured in China. There's a period of three to five years [for implementation].

What's your philosophy toward regulating stem cell therapies?

I think stem cell therapy is still at the very beginning. Recently, the minister of health decided to reinforce the regulation on this. Not long ago, actually, we made a decision that we should revisit all the clinical trials for those hospitals that haven't yet got approval and that they should stop.

When you come across an instance when there has been misconduct, in some cases the death penalty is used in China. Is that something that will continue in the future in the case of medicine?

The death penalty is very rarely used in China for misconduct unless it concerns severe damage to human life. I think most importantly we need to stop the tendency [of criminals] of using new technologies to get money. This is the big issue.