

"China will be the world leader in stem cell research"

Stephen Minger, King's College London

Stephen Minger is director of the biology laboratory of stem cells of the Wolfson Centre for Age-Related Diseases of King's College London. He has been pioneer in embryonic stem cell research in the United Kingdom. In 2001 he obtained one of the two first licences that the British Human Fertilisation and Embryology Authority (HFSA) conceded for the derivation of embryonic stem cells. The following year, his group generated the first line of these cells in the United Kingdom, one of the first in the world.

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The United Kingdom is one of the most prolific countries in stem cell research.

In the last years there has been a lot of public investment in this field, for both lines of adult and embryonic stem cells. Moreover, the British public generally welcomes this kind of research. The strong collaboration between the different British universities is also important. In London, for example, there is the London Network of Regenerative Medicine and at national level, the UK Stem Cell Network. The United Kingdom has to maintain these investment levels if it wants to remain competitive. China and the United

States are investing astronomic quantities and the UK could be left behind.

Does the recent move of Barack Obama to lift the veto on embryonic stem cells influence it?

The decision of Obama is important, but symbolic at large. I am not very optimistic because in the United State there isn't a coherent scenario in the federal field for the research on embryonic stem cells. Even if a scientist receives federal money from the National Health Institutes, the state can

decide if it can be used or not. Therefore many scientists don't feel too comfortable working with these cells: if the state goes from having liberal politicians to conservative, the researcher can see how his researchers fall flat on their face. Whilst the States have the last word, things will not change too much. And the problem is not due to lack of money, but to the regulation imposed by Bush; they are four to five years behind other more advanced countries. China will soon be the world's leader in stem cell research.

China?

The quantity of money invested in China is enormous. They have laboratories equipped with the latest technologies and their scientists are very prepared. The laws that regulate the research with embryonic stem cells are similar to those from the United Kingdom, very strict, but generally accepted. From the Buddhist-Confucian perspective, the embryo is not considered a human being until one day after it is born. At King's College we collaborate with scientists from the University of Zhejiang [Hangzhou], Fudan and Jiao Tong [both in Shanghai] and from the Institute of Biomedicine and Health of Canton.

With the current techniques of cell reprogramming, there are scientists that believe that therapeutic cloning is redundant.

The technology of cell reprogramming is a big step, but it cannot meet all expectations. For this motive it is necessary to research in parallel with conventional embryonic stem cells. The technique is so new that the iPS cells [induced pluripotent stem cells] are not properly characterized. Parallel research consists in cloning the same individual with two types of cells and compare properties and differences. But therapeutic cloning requires a large quantity of ova in order to be able to carry it out. Therefore, Lyle Armstrong, from the University of Newcastle, Justin St John, from Warwick University, and me encouraged a change in legislation at the end of last year; it allows the creation and use of human-animal hybrid embryos.

Something which at the beginning was very critical for British legislation...

It is the test where scientific rationality can omit often religious pressures. The United Kingdom is one of the most advanced and progressive countries in the world regarding its legislations on cell therapy, but it is extremely strict. In order to carry out studies on hybrid embryos one has to ask for its approval, as well as justify why such research cannot be carried out in another way. Also, hybrids cannot be kept alive for more than 14 days, when the embryo starts to develop. In any case, even though the legislation allows it, the team and necessary reagents for this type of research are extremely expensive, and the majority of the projects presented have not managed to get government funding.

Will this situation prolong itself in the future?

Regenerative medicine has a hopeful future, and therapies will be developed with both types of stem cells. Some will consist of injecting stem cells to substitute dead tissue; others will stimulate them from damaged tissue. Methods will be invented to repair tissues, especially those of the brain and heart, and work will be carried out with them to study new drugs, especially to measure their toxicity.

What has your group focused on?

We are interested in Parkinson's disease and type 1 diabetes. Introducing cells to patients with these disease works; the problem is that there are not sufficient stem cells available for transplant. Our objective is to manage to change defective cells for others that produce dopamine or insulin.

PROGRESS IN TRADITIONAL MEDICINE

Minger's team has recently initiated a very special collaboration with China. With the use of stem cell biology, the scientists from King's College aim to understand better the chemistry of traditional Chinese medicine to try and convert traditional remedies in future pharmacological products. The objective is to study the active principles in different stem cell types and see how these act.

The investment dedicated to this type of research is necessary not only to unblock the enormous potential of traditional medicine to treat common western disease.

It is also important to protect the public from insecure natural remedies. The complex differences between the western pharmacological products and the natural oriental products present a significant challenge for the development of conventional drugs based on traditional Chinese medicine.