An interview with Dr Jeremy Mao, Columbia University, New York, about dental stem cell research

Research has proven that dental stem cells hold potential for the successful regeneration of dental and other body tissues. In May, experts from around the globe gathered in New York for the first time to discuss the latest concepts and scientific breakthroughs at the International Conference on Dental and Craniofacial Stem Cells. Dental Tribune Asia Pacific Edition

Editor Daniel Zimmermann spoke with Columbia University professor and co-organiser Dr Jeremy Mao about the conference and when the first clinical applications might be available for dentists.

Daniel Zimmermann: Dr Mao, regrowing teeth or parts of it could mean an end to dentistry as we know it. When will this concept become reality?

Dr Jeremy Mao: Research in the area of dental tissue regeneration and engineering is developing rapidly. Different parts of the tooth, like the dental pulp, dentine and cementum have been already successfully regenerated in animal models. These techniques are not ready for clinical use yet but they will be available in a few years from now, depending on approval by regulatory agencies like the Food and Drug Administration in the US. Science is only one part of this process.

In contrast with embryonic stem cell research, three dental stem cells are harvested from what clinicians refer to as "dental waste" such as extracted teeth or teeth that have fallen out. What fields of dentistry will probably benefit most from this research?

There seems to be no limit to what tissue we can regenerate, so you can expect the whole range of dentistry fields to benefit from these techniques. It is only a matter of time until we have learned enough about these cells to be able to use them to regenerate all kinds of tissues.

Theoretically, there seems to be little controversy regarding dental stem cells. Why is that?

This is true. There is not much ethical discussion because unlike embryonic stem cells, which can only be obtained by destroying the fertilised embryo, dental stem cells can be obtained from teeth or teeth that have fallen out. This is true. There is not much ethical discussion because unlike embryonic stem cells, which can only be obtained by destroying the fertilised embryo, dental stem cells can be obtained from teeth or teeth that have fallen out. In contrast with embryonic stem cell research, these cells to be able to use them to regenerate all kinds of tissues.

Can dental stem cells be used for medical applications as well?

Very likely. Earlier this year, for example, we published an article that demonstrated that clones of mononucleated stem cells of dental pulp can transform into myoblasts and help with the formation of muscle tissue. This, and other research, suggests that dental stem cells can be used to treat not only dental diseases, but also other medical conditions.

Is there collaboration between scientists that work with dental and medical stem cells?

There are quite a number of researchers in Europe and Asia working on dental and craniofacial stem cell research. As far as research is concerned, people tend to look at the US first but as the conference has shown, there are quite a number of researchers in Europe and Asia working on dental and craniofacial stem cell research, including some countries where you would not expect such research to be conducted, like Malaysia.

Stem cell tissue regeneration will obviously have a significant impact on dental practice. Do you expect dental professionals to be open to this concept?

I think, as dental professionals we are quite enthusiastic about the potential of dental stem cells. They are not new. With it, we also hope to promote collaboration between scientists working in these areas.

Science is only one part of this process.

To some degree, but not to the extent that we would like. Let me give you an example. Two years ago, I attended a conference organised by the International Society for Stem Cell Research in Barcelona in Spain, and there was not one single presentation on dental stem cells. Realising that this was an understudied area, the idea of an international conference on dental and craniofacial stem cell research was born. With it, we also hope to promote collaboration between scientists working in these areas.

How did the congress in New York turn out, in general?

Looking back, it was quite an intense conference. We had over 200 attendees and 50 presentations over the course of three days. The feedback was extremely positive and there are already plans for a second conference. However, we have not decided on a location yet.

Which other regions or countries are currently leading in dental stem cell research?

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Endodontists, particularly amongst the elderly, is a major problem in countries with mass populations such as India or China. Could dental stem cell research offer the ultimate solution to this problem?

It would certainly not be right for any scientist or company working in this field to ignore these regions because there is such a strong clinical need. I am certain that as the technology develops, it will also be available to some of the populous regions in the world such as India, China or Africa. Of course, there is the problem of affordability, which was also discussed at the conference in New York. Stem cell therapies will be higher priced at the beginning but with a larger variety of products I am sure the prices will come down. Considering the importance of current restorative procedures, such as dental implants, I am sure stem cell regeneration will be a strong contender.

Thank you very much for this interview.