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 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, re-growing 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, dental stem cells are harvested from what clinicians refer to as “dental waste” such as extracted teeth or teeth that have fallen out. These cells are much easier to use and can regenerate all kinds of tissues.

Daniel Zimmermann: There seems to be no limit to what tissue we can regenerate. Why is that?

Dr Jeremy Mao: 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 are harvested from what clinicians refer to as “dental waste” such as extracted teeth or teeth that have fallen out. These cells are much easier to use and can regenerate all kinds of tissues. Some dental diseases, including root canal therapy, caries, periodontal disease and tooth loss, are common causes of dental waste. Now, dental stem cells offer a promising and ethical alternative for treating these conditions. Dental stem cells are harvested from tooth tissue we can regenerate, so you can expect the whole range of dentistry fields to be benefited from these techniques. Science 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.

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

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

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

Dr Jeremy Mao: Yes, there is. There seems to be no limit to what tissue we can regenerate, so you can expect the whole range of dentistry fields to be benefited from these techniques. 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.

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

Dr Jeremy Mao: I think, as dental professionals we are quite used to new inventions and innovations. I have had the opportunity to lecture to various groups of members of the profession, such as oral surgeons and pediatric dentists, and with a few exceptions they were quite enthusiastic about the potential of dental stem cells for tissue regeneration and engineering. In acknowledging that regenerative endodontics could be the next evolution in root-canal treatment, the American Association of Endodontists has set up a special committee that will provide funding for research projects in this area in future.

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Daniel Zimmermann: Edentulism, 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?

Dr Jeremy Mao: 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 high costs 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.