

DENTAL SOFT TISSUES – AS A SOURCE OF STEM CELLS FOR REGENERATIVE MEDICINE

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Regenerative medicine based on cell therapy and tissue engineering is an emerging multidisciplinary field involving molecular and cellular biology, medicine, physics, materials science and genetics. Stem cells are distinguished from other cells because they may renew themselves through cell division after long periods of inactivity. Stem cells are unspecialized and may give rise to specialized types of cells like chondroblasts or odontoblasts. When a stem cell divides, each new cell remains either a stem cell or becomes a different type of cell with a more specialized function like a muscle, blood, or brain cell. Stem cells are able to replenish other cells as long as the body is still alive. Temporary or permanent tooth extracted by medical indications, as a residue after removal can be a source of autologous stem cells, which after processing can be used in therapy for restoring damaged tissue donor including the maxilla facial region.

Preliminary results which have been obtained, including tissue engineering and cell culture laboratory have demonstrated the possibility of obtaining stem cells from dental pulp. This project represents a strategic research in medical biotechnology.

The purpose of the proposed research is the development of the protocol for obtaining stem cells from dental pulp mesenchymal origin, osteoprogenitor cell differentiation in the possibility of their use in tissue engineering of bone tissue of maxilla facial region in vivo and subsequently in treatment of patients.

Material and Methods The study was effectuated on 25 extracted Vietnamese pigs teeth aged between 2-3 months. The cells were obtained from dental pulp by digestion in 0,25% dispase I (SIGMA) for 10 min at 37 °C. The cells were cultivated in 24 well in triplicate, in DMEM (HiMedia), 10% FBS (SIGMA), 5% CO₂, 96% humidity and temperature 37°C.

Results and discussion The cells were cultivated in 0,5x10⁶ cells per well, in 3,0cm diameters culture dish during seven days. The half media was changed by fresh one every two days. At the end of this period cells were colored by Romanovski and counted under the light microscope. The number of the cells after seven days cultivation were: 4,5±0,3x10⁶ per well.

Conclusions Teeth could be a rich source of adult stem cells. Many intra-oral tissues, such as deciduous teeth, wisdom teeth and the gums, are not only easily accessible from the oral cavity but can also often be obtained as a discarded biological sample. Therefore, dental professionals should recognize the promise of the emerging field of regenerative dentistry and the possibility of obtaining stem cells during conventional dental treatments that can be banked for autologous therapeutic use in the future.