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## DENTAL STEM CELLS: MOVING FROM THE LABORATORY BENCH TO THE PATIENT'S BEDSIDE

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### SUMMARY

Mesenchymal stem cells (MSCs) research has been a field of great clinical interest with immense possibilities of using the cells to replace, restore or enhance the biological function of damaged tissues and organs due to accidents, diseases and/or developmental defects. Recent studies have demonstrated that MSCs are derived from various tissues including bone marrow adipose, dental and umbilical cord. MSCs derived from teeth and supporting tissues are known as dental stem cells (DSCs) and have been mainly characterized into five different cells types including dental pulp stem cells (DPSCs), dental follicle stem cells (DFSCs), periodontal ligament stem cells (PDLSCs), stem cells from human deciduous teeth (SHED) and stem cells from the apical papilla (SCAPs). Considering their original function in development and the homeostasis of tooth structures, many applications of these cells in dentistry have aimed at tooth structure regeneration such as endodontic therapy, dentin regeneration, regenerative periodontal therapy, and bioengineered teeth. However, the application in other than tooth structures has been attempted extensively. This is because the DSCs can also differentiate into several cell types, such as neurons, adipocytes, and chondrocytes. As such, although clinical trials using dental stem cells for treating human diseases are not very common, preclinical research has broadened the extent of potential clinical applications of these cells namely in neurological disorders, angiogenesis and vasculogenesis, liver disease and diabetes mellitus. While growing evidence demonstrates that the dental and oral tissues a rich source of MSCs, their use in regenerative therapies may be limited due to the requirement to isolate tissue at the time of need. The banking of DSCs or tissues obtained from teeth may, therefore, provide a practical approach to address this caveat. Hence, this presentation will detail the importance of DSCs focusing on the basic biology and potential role of dental stem cells in the treatment and regeneration of cells, tissues, and organs.