

# **Isolation and *in vitro* culture of mesenchymal stem cells extracted from human dental pulp yields osteogenic, neurogenic, and uncommitted progenitors: a pilot study.**

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## **Abstract**

**Background:** Mesenchymal stem cells derived from dental pulp may be capable of regenerating many tissue types, including bone, adipocyte, vascular, and neural tissues. Despite evidence suggesting potential clinical applications and therapies for dental pulp –derived stem cells (DPSC), no consensus exists regarding the methods or feasibility for academic dental centers to foster this type of research and enquiry. Furthermore, few evidence-based practical recommendations are currently available for patients interested in DPSC banking and long-term storage. This initial pilot study sought to provide further evidence regarding these specific issues.

**Results:** Forty nine (49) dental pulp samples were collected; twenty two (22) were isolated using enzymatic digestion (DPSC-ED) and twenty seven (27) samples using direct outgrowth (DPSC-OG). Four (4) potential DPSC cell cultures were derived: dpSC-11418, dpSC-11750, dpSC-17322, and dpSC-11836, yielding an overall success rate below ten (10) percent. RT-PCR screening of mRNA for mesenchymal stem cell and differentiation markers (CD44, NANOG, Oct4, ALP, and *βIII tubulin*) revealed the DPSC isolates may be odontoblast progenitors (dpSC-11418), neuronal progenitors (dpSC-11750), and uncommitted or unknown (dpSC-17322, dpSC-11836).

**Conclusions:** This pilot study provides evidence that DPSC research may be feasible at many academic research centers, although the costs and effectiveness can vary considerably. As patients, and students, request additional information about the potential of DPSCs to be used in future applications for cell regeneration, these studies provide some direction for clinicians and administrators as they develop recommendations for DPSC research initiatives and services.