

*Isolation of Multipotent Postnatal Stem Cells from  
Human Periodontal Ligament*

**Thesis**

**Submitted for the partial fulfilment of the requirements for  
Master degree in Oral Medicine and Periodontology**

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# عزل الخلايا الجزعية من الرباط حول السننى للاسنان

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## **Conclusions**

- STRO-1 and CD 146 positive cells were isolated from the periodontal ligament, indicating that periodontal ligament is a source for postnatal stem cells.
- The periodontal ligament stem cells showed their ability to form adherent clonogenic cell clusters of fibroblast-like cells and many researchers have indicated that periodontal ligament stem cells have multipotential differentiation ability as well.

## **Recommendations**

- Periodontal tissue regeneration using autologous stem cells may be promising as a future cell-based therapy for periodontal diseases.
- Further studies are needed to be carried out to identify unique markers for periodontal ligament stem cells, and molecular and genetic approaches are mandatory.

## مستخلص الرسالة (abstract)

### باللغة العربية:

فى هذه الرسالة تم عمل دراسة الاميونوسيتوكيميائية : ليتم التعرف على الخلايا الجزعية التى توجد فى نسيج الرباط حول السننى عن طريق اجسام مضادة لها مثل STRO-1 و CD146 ( و هم يعتبروا من اهم المؤشرات المبكرة للخلايا الجزعية). ايضا تم عمل الفلو سيتوميترى : حيث تم عزل الخلايا الجزعية الموجبة ل STRO-1 عن باقى خلايا الرباط حول السننى وقدرت نسبتها بحوالى 24% و كانت نسبة 1.13% هى الاكثر ايجابية من بين هذه الخلايا. بناء على ذلك فان الخلايا الجزعية المعزولة من الرباط حول السننى تعد مصدر نافع لتعويض الانسجة التالفة الناتج عن التهاب الرباط حول السننى.

### باللغة الأجنبية:

Immunocyto fluorescence for identification of STRO-1 and CD 146 positive cells and flow cytometry for STRO-1 positive cell sorting were carried out. The results of the immunocytofluorescence staining with STRO-1 and CD146 antibodies were positive. The flow cytometric analysis showed 24.53% positive cells for STRO-1 with 1.13% strongly positive stem cells in the periodontal ligament. Accordingly, stem cells obtained from the periodontal ligament may be a promising treatment modality for regenerating tissues destroyed by the periodontal diseases.



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## الكلمات الدالة:

عزل، الخلايا الجزعية، الرباط حول السن، تجديد.

## Key words:

Isolation, stem cells, periodontal ligament, Regeneration.

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**List of abbreviations**

<b>ALP</b>	Alkaline phosphatase
<b><math>\alpha</math>- MEM</b>	Alpha- Modified Eagle's Medium
<b>BMSC's</b>	Bone Marrow Stem Cells
<b>BSP</b>	Bone sialoprotein
<b>CFU-F</b>	Colony forming unit- fibroblast
<b>DAPI</b>	4, 6- diamino-2-phenylindol
<b>DPSC's</b>	Dental Pulp Stem Cells
<b>DFSC's</b>	Dental Follicle Stem Cells
<b>EDTA</b>	Ethylene diamine tetra acetic acid
<b>FACS</b>	Fluorescent Activated Cell Sorting
<b>FSC</b>	Forward scatter

<b>GFAP</b>	Glial Fibrillary Acid Protein
<b>HA/TCP</b>	Hydroxy apatite / tricalcium phosphate
<b>ICC</b>	Immunocytochemistry
<b>MC</b>	Mesenchymal Cells
<b>MSC</b>	Mesenchymal Stem Cells
<b>PBS</b>	Phosphate Buffered Saline
<b>PDL</b>	Periodontal ligament
<b>PDLSC's</b>	Periodontal Ligament Stem Cells
<b>SCAP</b>	Stem Cells from the Apical Part of the human dental papilla
<b>SHED</b>	Stem Cells from Human Exfoliated Deciduous Teeth
<b>SSC</b>	Side Scatter

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