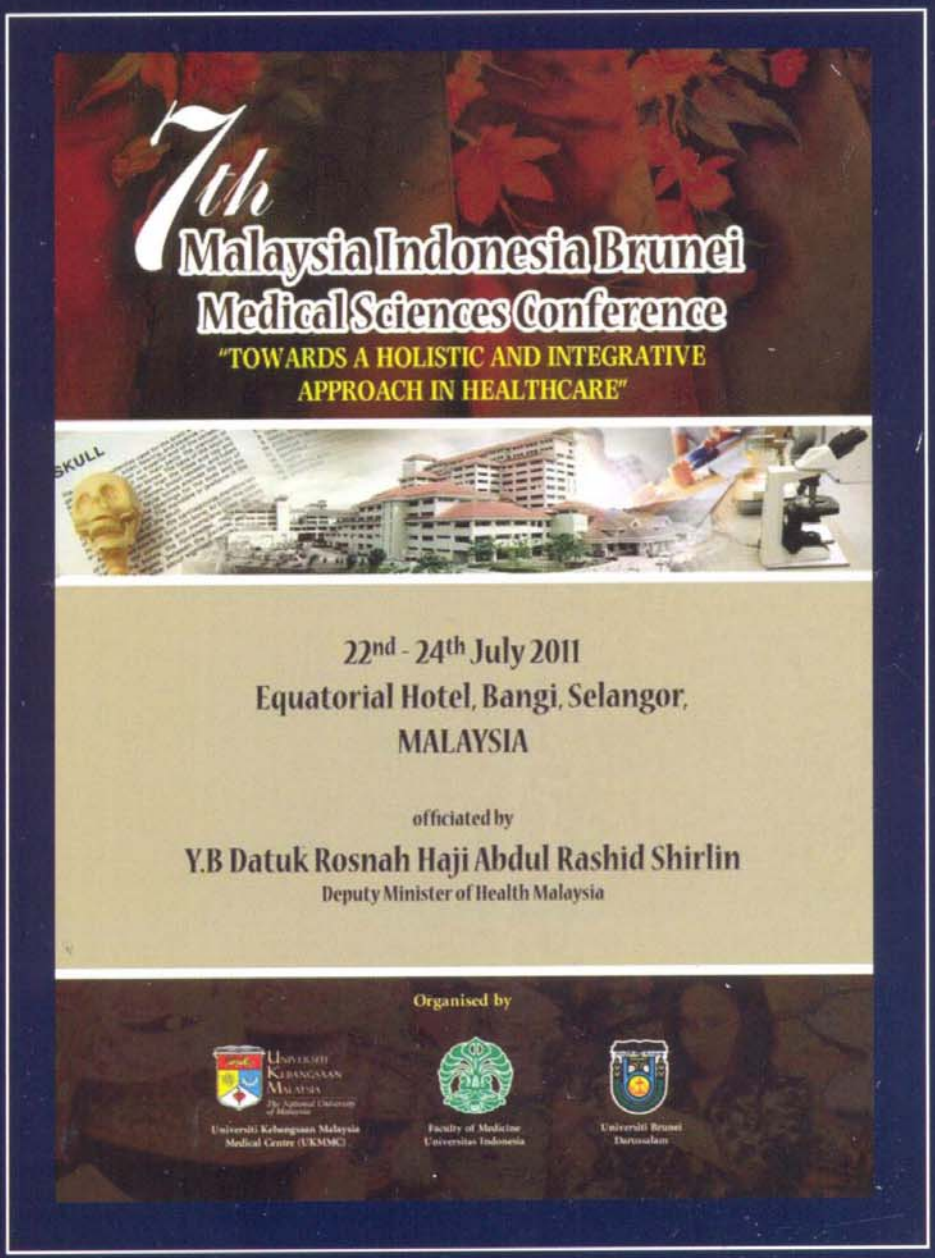
Volume 6, No. 1 (Supplement)
June 2011
ISSN 1823-2140

The National University with an INTERNATIONAL REACH

UNIVERSITI KEBANGSAAN MALAYSIA
National University of Malaysia

MEDICINE & Health

The Official Journal of The Faculty of Medicine UKM



THE REGENERATION OF DENTAL HARD TISSUES FROM CULTURED RAT TOOTH BUD CELLS

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Background:
The incidence of children with missing primary and adult teeth is high. The main aim of our study is to engineer teeth using cultured tooth bud cells seeded onto PLGA scaffold.

Materials and Methods: Three- to five-days old post-natal (dpn) Lewis rat tooth bud cells were cultured and then seeded onto 3mmx5mm PLGA scaffold. The PLGA scaffold was coated with fibrin. The tooth constructs were grown in the subcutaneous of nude mice for eight weeks, and then harvested. For characterization of the cells, RT-PCR and immunocytochemistry were performed. Dentin Sialophosphoprotein (DSPP) and Amelogenin Precursor were the primers used in this study. AMELX and PCK-26 were the antibodies for immnunocytochemistry. For in vivo analysis, Micro CTScan was done at four, six, and eight weeks to observe the hard tissue formation of tooth construct in the subcutaneous of nude mice. Haematoxylin and Eosin had been carried out to observe the histological formation after harvesting.

Results:
For cell characterization, Dentin Sialophosphoprotein (DSPP) and Amelogenin Precursor were positively expressed. Immunocytochemistry staining demonstrates positive staining for both antibodies; AMELX and PCK-26. After eight weeks implantation, hard tissue formations were observed using Micro CTScan. For H&E analysis, extracellular matrix and residual PLGA were observed.

Conclusions:
Implantation of cultured Lewis rat tooth bud cells incorporated with PLGA into subcutaneous of nude mice showed promising results for tooth tissue engineering.

Keywords:
Tissue engineering, tooth bud cells, PLGA