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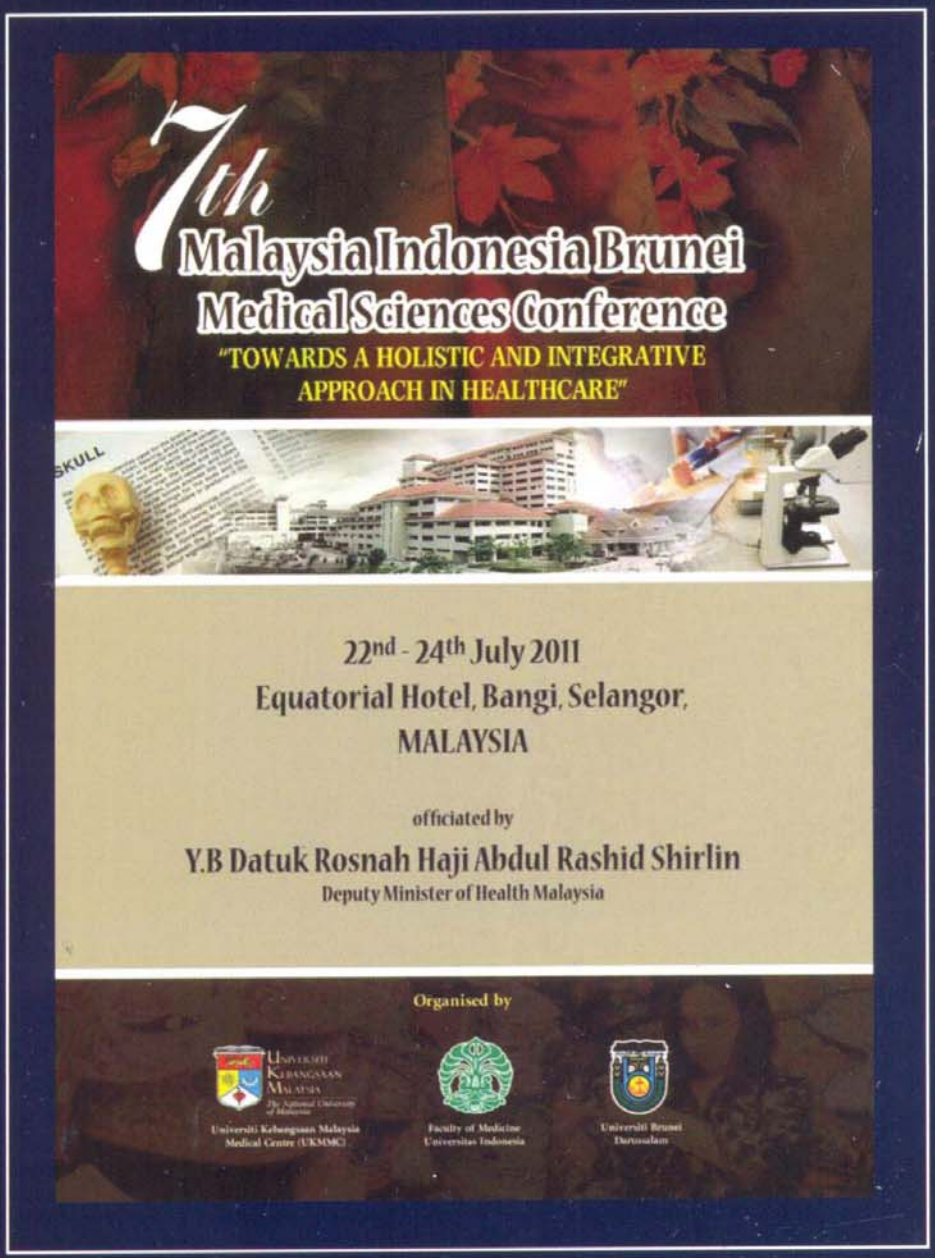

HUMAN ADIPOSE TISSUE DERIVED STEM CELLS AS A SOURCE OF SMOOTH MUSCLE CELLS IN THE REGENERATION OF MUSCULAR LAYER OF URINARY BLADDER WALL

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Background:
Adipose tissue provides an abundant source of multipotent cells which represent a source for cell-based regeneration strategies for urinary bladder smooth muscle repair. Our objective is to confirm that adipose derived stem cells (ADSCs) can be differentiated to smooth muscle cells.

Materials & Methods:
In this study adipose tissue sample was digested with 0.075% collagenase, and the resulted ADSCs cultured and expanded in vitro. ADSCs at passage 2 was differentiated by incubation in smooth muscle inductive media (SMIM) consisting of MCDB I31 medium, 1% FBS, 100 U/ml heparin for three and six weeks. ADSCs in non-inductive media were used as control. Characterizations were performed by cells morphology, gene and protein expression.

Results:
Differentiated cells became elongated and spindle shaped, and towards the end of 6 weeks, sporadic cell aggregation appeared which is typical for smooth muscle cells culture. For gene expression study smooth muscle markers i.e. Alfa smooth muscle actin (ASMA), calponin, and Myocin heavy chain (MHC) were used. Expression of these genes was detected by PCR after three weeks differentiation. At the protein expression level ASMA, MHC, Smoothelin were expressed after six weeks differentiation. However only ASMA, and Smoothelin was expressed after three weeks differentiation.

Conclusion:
Adipose tissue provides a possible source of smooth muscle precursor cells which possess the potential capability for smooth muscle differentiation. This represents a promising alternative for urinary bladder smooth muscle repair.

Key Words:
tissue engineering, human, adipose stem cells, smooth muscle cells, urinary bladder