6th MTERMS 2016

Malaysian Tissue Engineering and Regenerative Medicine Scientific Meeting

in conjunction with

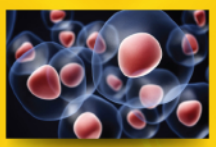
2nd Malaysian Stem Cell Meeting

"Ensuring sustainability through innovative regenerative technologies"

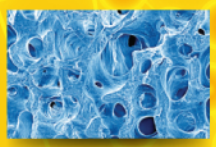
17th - 18th November 2016

The Light Hotel
Seberang Jaya, Penang

Topics



- Reprogramming and pluripotency
- Stem Cell and Cancer



- Biomaterials and Tissue Regeneration
- Transplantation and immunomodulation

- 3D Bioprinting and tissue engineering

- Cell and Gene Therapy
- Imaging and Pre-Clinical Model

Organised by

Institut Perubatan & Pergigian Termaju (IPPT), USM and
Tissue Engineering & Regenerative Medicine Society of Malaysia (TESMA)

Co-organised by

Malaysian Society for Stem Cell Research and Therapy (MSCRT)

P-BTR 2

Poly(lactic-*co*-glycolic acid) and atelocollagen hybrid scaffold seeded with annulus fibrosus cells enhances the formation of cartilaginous tissue engineered construct *in vitro*

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Purpose: To evaluate the *in vitro* formation of 3D tissue engineered constructs (TECs) using rabbits' annulus fibrosus (AF) cells seeded on poly(lactic-*co*-glycolic acid) (PLGA) based scaffolds.

Methods: Porous disc-shaped PLGA was fabricated using solvent casting and salt leaching technique. It was crosslinked with atelocollagen to form "PA"scaffold group. Fibrin was added to PLGA and PLGA-atelocollagen composite to form "PF" and "PAF" scaffolds, respectively. The AF cells were seeded into the prefabricated scaffolds ($1.0x10^5$ cells per scaffold) to form the following TECs groups: AF+PLGA (AFP; *control*), AF+PLGA+atelocollagen (AFPA), AF+PLGA+fibrin (AFPF) and AF+PLGA+atelocollagen+fibrin (AFPAF). The resulting TECs were cultured for three-week and evaluated for cells viability using MTT assay, cellular morphology and attachment using SEM, cartilaginous matrix production using sGAG assay and DNA content using PicoGreen® assay.

Results: Significant number of viable cells was observed in the AFPAF group (987,985.7±286,858.9 cells)when compared to other TECs(AFP: 373,319.0±5,456.9; AFPA: 547,763.4±66,038.2; AFPF: 463,763.4±46,160.8 cells). Cellular morphology and attachment were comparable in all TECs. The AFPA has the highest sGAG accumulation (0.279±0.117 mg/ml) but shows no statistical difference when compared to the other TECs (AFP: 0.083±0.038; AFPF: 0.237±0.131; AFPAF: 0.181±0.024 mg/ml).The AFPF has the highest DNA content (1,919.338±89.050 ng/ml) but shows no statistical difference when compared to the other TECs (AFP: 485.659±27.468; AFPA: 845.987±82.134; AFPAF: 1,575.007±307.174 ng/ml). Hence, atelocollagen seemed to provide better environment for cellular attachment and proliferation. This unique collagenous material also promotes sGAG production and DNA content in TECs.

Conclusion: The incorporation of atelocollagen into PLGA scaffold enhances the formation of TECs *in vitro*.