

Evaluation of Bone Marrow-Seeded Porous Scaffolds at Post-Intramuscular Implantation in a Rat Model

Stefen Noristan Kurniawan Kosmas & ¹Md. Zuki Abu Bakar

*¹Department of Veterinary Preclinical Sciences
Faculty of Veterinary Medicine, Universiti Putra Malaysia*

Abstract

Improvements to current therapeutic strategies are needed for the treatment of skeletal defects. Bone tissue engineering offers potential advantages to these strategies. One of the approaches in the development of bone graft substitutes is through use of scaffolds. The purpose of this study was to evaluate the ectopic bone formation of the bone marrow-seeded porous scaffold. Local cockle shell, *Anadara granosa* was used as material for scaffold. Eighteen rats were divided into 3 equal groups. Three different scaffolds were prepared for each group. Each rat was implanted with 2 scaffolds; the bone marrow-seeded scaffold was implanted into right gastrocnemius muscle whereas the non-seeded scaffold implanted at the contralateral side. Serum alkaline phosphatase and calcium concentrations were determined before and 3 weeks after implantation. Radiograph examination was done every week. At the end of week 3, all rats were sacrificed for histological evaluation. The radiographic examination and serum assays revealed that the scaffold can induce osteogenesis without exerting harmful effect to the body. Histological examination showed presence of new bone formation and blood vessels in bone marrow-seeded scaffold. Therefore, the bone marrow-seeded scaffold has characteristics of osteoconductive, osteoinductive, biodegradable and biocompatible properties.

Keywords: scaffold, ectopic bone formation, *Anadara granosa*, osteogenesis.