AN IN VIVO BIOCOMPATIBLE STUDY OF ANTIMICROBIAL BIOCOMPOSITE MEMBRANE: PRELIMINARY OUTCOME

Sarah Haryati Mohd Zohari[1], Ahmad Hafiz Zulkifly[1], Rosnani Abd Jalil[1], Nurul Hafiza Mohd Jan[1], Muhamad Ezham Zainal Abdullah[1], Che Nor Zarida Che Seman[1], Mohd Zulfadzli Ibrahim[1], Zahana Abd Hamid[1]

[1]International Islamic University Malaysia

Introduction: GBR is a surgical procedure that uses barrier membranes to treat bony defects in patients undergoing orthopedic and craniomaxillofacial surgery. The membrane plays an important role in proper bone regeneration as it will cover the bone defect, which can help improve new bone ingrowth. A triple-layered membrane containing poly (lactic-co-glycolic acid) (PLGA) matrix with bioactive apatite filling and LA, which is a naturally derived antimicrobial substance is one of the examples of membrane used. CSD is an experimental method for the in vivo assessment of tissue-engineered construct. It has been used as an experimental model in evaluating the effectiveness of newly developed biomaterials to stimulate bone formation before clinical application. New Zealand White Rabbits (Oryctolagus cuniculus) are commonly used rabbits for laboratory research and industry toxicology studies. By using the CSD technique in the New Zealand White Rabbit, this study seeks to investigate the biocompatibility and potential effect of the antimicrobial biocomposite membrane through in vivo analysis.

Methodology: 1) Pre-Operative (A) Animal Operation Room Preparation (B) Animal Preparation (C) Drug Preparation 2) Intra-operative Procedure 3) Post-Operative Care 4) Radiographic Assessment 5) Euthanasia 6) Histological Analysis

Results: Gross observation shows good contact between the rabbit bone and implant. A close-up (3 weeks sample) view of the new bone shows osteoid. Stroma shows very cellularly with dense collagenous tissue fibers. A longitudinal section of the material interface at a 6-week interval shows the cortical part of the tibia and new bone in closed contact with the tested material.

Conclusion: Gross observation showed excellent contact between the bone and implant membrane for all rabbit models. Histological analysis revealed close contact between the new bone and tested material From this outcome, it may be concluded that the biocomposite microbial membrane testing material is a biocompatible implant.