UNIVERSITI TEKNOLOGI MARA

TISSUE MORPHOLOGY STUDY : HEMATOXYLIN AND EOSIN STAINING IN HEALING PROCESS OF FULL THICKNESS WOUND ANIMAL MODEL

CAROLINE ESTHER PAUL

Dissertation submitted in partial fulfillment of the requirements

for the degree of

Bachelor of Pharmacy (Hons.)

2014

ABSTRACT

The healing process of full thickness wound is a complex process involving domination of different cells that each plays important roles in different phase of the healing process. The objective of this study was to elaborate a histological study of deep burn wound healing in rats. In this study, deep burn wounds were inflicted on the dorsal part of six anesthetized male rats. Histological sections from tissue specimen of the wounds harvested at day 0, 2, 7, 14, 21 and 28 post wounding were stained with hematoxylin and eosin. The histology of the wounds were correlated with stages in wound healing process. The inflammatory phase was observed at day 2 post wounding with infiltration of polymorphonuclear neutrophils in the wound bed. The proliferative phase was seen at days 7 and 14 post wounding with microscopic presence of blood capillaries and macrophages. Subsequently, the remodelling phase was observed at days 21 and 28 post wounding with domination of fibroblasts forming granulation tissue, filling the wound matrix. The wound healing phases were discussed based on the evaluation of the histological sections. This study serves as a preliminary study and the results of this study can be used as an experimental model for further research using pharmacological or physical intervention that can enhance the wound healing process.

ACKNOWLEDGEMENT

First and foremost, I want to say a grateful thank you to my supervisor, Mdm. Nor Amlizan binti Ramli, my supervisor for her guidance and valuable advices that have save me a lot during doing this final year project and also to Dr. Rozaini binti Mohd Zohdi, my co-supervisor for her assistance.

I would also wish to express my gratitude to Dr. Hafidz, a veterinarian from Laboratory Animal Facility and Management (LAFAM) for sharing his knowledge that really useful to this project. A great thank also to Mdm Huzaima, the Science Officer of BRAIN laboratory for giving helping hand in laboratory work.

I also want to thank all the staff of Laboratory Animal Facility and Management (LAFAM) as well as to those laboratory personnels and master students of Faculty of Pharmacy that have assisted me along the way of completing this project. Not to forget, many thanks also to all my friends and family for their support and encouragement given without cease until this project completed.

Table of Contents

Title page.....i

Approval Sheet.....ii

Abstract.....iii

Acknowledgement.....iv

Table of Contents.....v

List of Figures.....viii

List of Tables.....x

List of Abbreviations.....xi

Chapter 1 : Introduction.....1

1.1 Introduction.....1

1.2 Problem Statement.....2

1.3 Research Objectives.....2

1.4 Significance of Study.....3

1.5 Hypothesis.....3

Chapter 2 : Literature Review.....4

2.1 Skin.....4

CHAPTER 1

INTRODUCTION

1.1 Introduction

Skin is the primary body protective barrier against the physical and chemical harm from outside the body. When skin is accidentally injured, wound is formed and the wound opens access for microbes and chemicals to enter the body. Naturally, the body will attempt to cleanse and close the wound and remodel the damaged part of the skin structure. This process is known as wound healing. Wound healing is a complex process as it involves various reactions and interactions among cells. The complexity of the healing process depends on the severity of the wound (Broughton, Janis & Attinger, 2006).

The process of wound healing starts with inflammatory phase, then continue to proliferative phase and finally, remodeling phase. In each of these phases, there are distinct and specific events occur. The accumulation of platelet, coagulation and migration of leukocyte mark the inflammatory phase. The re-epithelialization, angiogenesis, fibroplasia and wound contraction indicate the proliferative phase. Proliferative phase lead to tissue restoration and, eventually, tissue remodeling by the production of collagen and matrix proteins which characterized the remodeling phase. These three phases of wound healing start in sequence but they overlap in time (Li, Chen & Kirsner, 2007). In the process of wound healing, there are different cells involved. Apart from the epithelial cells, cells such as neutrophils, macrophages, endothelial cells and fibroblasts also take part (Tsirogianni, Moutsopoulos &