

Applications of biomaterials in wound healing management: from fundamental physiology to advanced technology

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13.1 Introduction

Skin is the major organ in the human body. It serves numerous purposes, from metabolic to endocrine functions. It is also a critical mechanism for avoiding direct contact with the body's internal structures and the outside environment. When any break in the outer wall occurs, the internal machinery of the skin quickly triggers the repair. Although the usual concept of wound requires a visual identification of blood due to traumatic events in the blood vessels at the dermis level, some exceptions do occur. Under a hemorrhagic event, an in situ clot immediately prevents further loss of blood and the invasion of the organism by microorganisms and other parasites. Four steps are currently considered in the process of wound healing: hemostasis, inflammation, proliferation, and finally maturation. These steps do not strictly happen in a chain.

Nevertheless, each of the four considered phases possesses specific features allowing their distinction. The inflammation step requires the enrollment of immune cells at the site of the wound. Such cells are activated monocytes (precursors of macrophages), macrophages, and neutrophils, being these last responsible for the cleaning of any type of foreign materials and intruder organisms [1]. The moment on which occurs a clear transition from the previous to the