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G. 知的所有権の取得状況

1．特許取得

なし

2．実用新案登録

なし

3．その他

なし

Ⅱ．研究成果の刊行に関する一覧表

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Ⅲ. 研究成果の刊行物・別刷

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Chapter 15

Periodontal regeneration by FGF-2: Present status and future outlook

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Introduction

At present a variety of regenerative therapies are available in the field of periodontal therapy, such as bone grafts, guided tissue regeneration (GTR) and application of enamel matrix derivatives, all of which have achieved a measure of success. However, a number of issues with these techniques remain to be solved, including technique sensitivity, limitation of indications, predictability, and the longevity of outcomes.

In the 1990s, Langer and Vacanti (1993) developed the concept of tissue engineering, consisting three key elements: signaling molecules, scaffolds and stem cells (Figure 1). They proposed that the active introduction of one or more of the triad enables the induction of desirable tissue regeneration. In relation to periodontal regenerative therapy, the use of somatic tissue stem cells and/or progenitor cells within periodontal ligaments to act as "stem cells" has been demonstrated (Seo *et al* 2004). In order to enhance the outcomes of tissue regenerative therapy, it is crucial to stimulate the biological activities of these cells, and a physiologically efficient method for doing so is through the use of cytokines or growth factors. The ability of various recombinant cytokines to enhance periodontal tissue regeneration has been investigated in preclinical and clinical studies (Table 1). This chapter reviews the potential use of basic fibroblast growth factor (bFGF, FGF-2) to promote periodontal tissue regeneration, with a discussion of the current status and prospects of FGF-2 therapy.

In vivo analyses of effects of FGF-2 on periodontal regeneration

Fibroblast growth factor (FGF) was discovered in 1974 as a protein from bovine pituitary glands that strongly induces proliferative activity in fibroblasts (Gospodarowicz 1974). In 1984, two distinct proteins with different isoelectric points were fractionated from the pituitary extract using acidic and basic pHs, which became known as acidic FGF (aFGF, FGF-1) and basic FGF (bFGF, FGF-2), respectively (Bohlen *et al* 1984, Thomas *et al* 1984). A year later the entire amino acid sequence of bovine FGF-2 was determined, and the cDNA of human FGF-2 was cloned in 1986 (Abraham *et al* 1986, Esch *et al* 1985). FGF-2 has received particular attention in the field of regenerative therapy, as it stimulates various stem cells to proliferate while maintaining their multipotency, and is a strong inducer of angiogenesis.

In order to evaluate the effectiveness of