SACCHACHITIN membrane.

DISCUSSION

In 1977, Raju *et al.* suggested that an intense inflammatory response as a result of wound infection may greatly promote the differentiation of granuloma granulation tissue leading to better wound healing.[19] Franz *et al.* also discovered that a fetus wound infected by bacteria caused the same healing response as that observed in adults with the formation of a scar.[20] Although excessive inflammation leads to the death of tissue and a delay in wound healing, it is still recognized as beneficial to the body itself. It has been demonstrated that an appropriate inflammatory response can expel tissue debris, clean away foreign substances, minimize the chance of secondary infection, and promote the repair of tissue.[21-24] In the implantation study, an acute inflammatory reaction in the tissue was observed when the lesion was implanted with SACCHACHITIN membrane (Fig. 7a). It is believed that SACCHACHITIN membrane induces a similar phenomenon as a minor infection in the wound. This complies with what has been observed with the effect of SACCHACHITIN membrane on wound healing: on day 4, histological examinations revealed many more macrophages in the wound tissue. This was even more apparent on days 7 and 16. Furthermore, polymorphonuclear cells fused with macrophages were also apparent. This phenomenon of an accelerated wound-healing process is similar to that observed with the use of 20% benzoyl peroxide suspension[25] and also to that reported for chitin in the literature.[3]

In 1960, Prudden *et al.* discovered that cartilage was able to accelerate wound healing.[6] Furthermore, N-acetyl-D-glucosamine was shown by the same group to be responsible for acceleration of wound healing by chitin. Since SACCHACHITIN membrane is composed of 40% chitin and 60% β-1,3-D-glucan and a similar effect was observed in the wound healing process as with by chitin, its main mechanism of accelerating wound healing most likely can be attributed to its chitin component. Nevertheless, β-1,3-D-glucan itself is a strong activator of macrophages and is capable of attracting polymorphonuclear white cells.Since activated macrophages are known to accelerate wound healing,[26] the important role played by β-1,3-D-glucan can not be excluded.

Compared to SACCHACHITIN membrane, the macrophage reaction to foreign substances was the main response in the implantation study with gauze. Nevertheless, a smaller amount of macrophages was observed in a histological examination of the wound tissue covered with gauze. The main reason for this is still unclear. A possible reason is that a layer of thick crust, which was formed from the exudate secreted by the wound during an earlier stage, effectively prevented contact of the gauze with the wound.During the healing of the wound, the crust together with a major part of the gauze detached resulting in them not being recognized as a foreign substance (Fig. 7b).

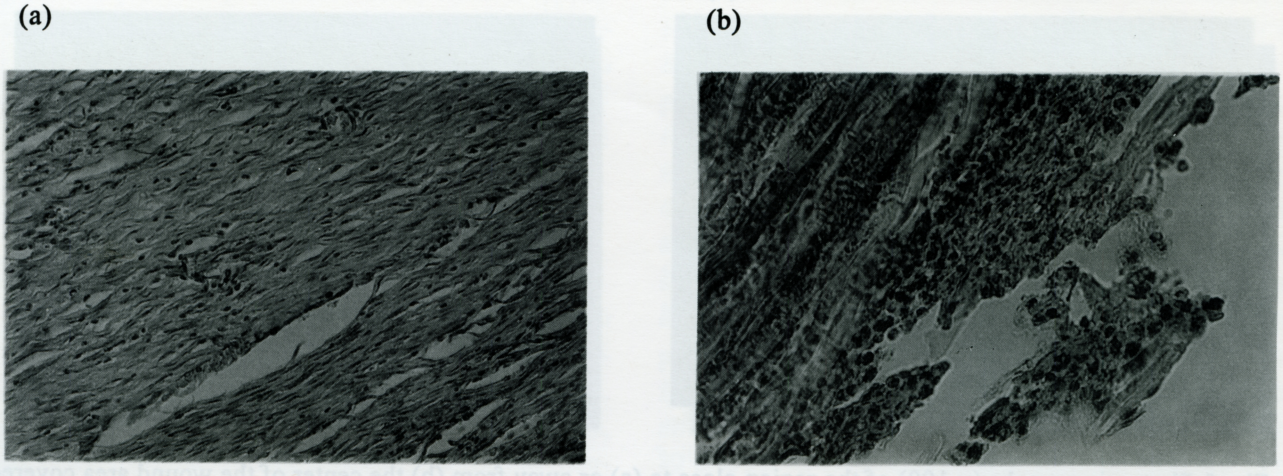

Fig. 6. Photomicrographs (× 100) of the region close to (a) or away from (b) the center of the wound area covered with gauze for 16 days.