Novel Application Method for Mesenchymal Stem Cell Therapy Utilizing Its Attractant-Responsive Accumulation Property

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（創傷治癒促進を目指した間葉系幹細胞の新規投与法についての検討）

区　　分　：甲

論　文　内　容　の　要　旨

Stem cell therapy is an emerging treatment modality for various diseases. Because mesenchymal stem cells (MSCs) are known to accumulate at the site of damage, their possible clinical application has been investigated. MSCs are usually administered using intravenous injection, but this route carries a risk of pulmonary embolism. In contrast, topical injection of MSCs reportedly has an inferior therapeutic effect. We developed a remote administration method that uses collagen gel as a scaffold and investigated the effect of this scaffold on the retention of stemness, homing ability, and therapeutic effect using a mouse tooth extraction model. After verifying the retention of stemness of MSCs isolated from the bone marrow of donor mice in the scaffold, we administered MSCs subcutaneously into the back of the recipient mice with scaffold and observed the accumulation and the acceleration of healing of the extraction socket of the maxillary first molar. The MSCs cultured with scaffold retained stemness, the MSCs injected into back skin with scaffold successfully accumulated around the extraction socket, and socket healing was significantly enhanced. In conclusion, administration of MSCs with collagen scaffold at a remote site enhanced the lesion healing without the drawbacks of currently used administration methods.