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Poly(acrylic acid)/Polyethylene glycol hydrogel prepared by using gamma-ray irradiation for mucosa adhesion

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A buccal delivery system provides a much milder environment for drug delivery compared to an oral delivery which presents a hostile environment for drugs, especially proteins and polypeptides, owing to acid hydrolysis. Local delivery in an oral cavity has particular applications in the treatment of toothaches, periodontal disease, and bacterial infections. Poly(acrylic acid) (PAA)-based hydrogels prepared using a chemical initiator have been attempted for a mucoadhesive system owing to their flexibility and excellent bioadhesion. In this experiment, PAA and polyethylene glycol (PEG) were selected to prepare using a radiation process a bioadhesive hydrogel for adhesion to mucosal surfaces. PAA and PEG were dissolved in purified water to prepare a homogeneous PAA/PEG solution, and the solution was then irradiated using an electron beam at dose up to 70 kGy to make the hydrogels. Their physical properties, such as gel percent, swelling percent, and adhesive strength to mucosal surfaces, were investigated. In this experiment, various amounts of PEG were incorporated into the PAA to enhance the mucoadhesive property of the hydrogels. The effect of the molecular weight of PEG on the mucoadhesion was also examined.

Biography

Deok-Won Lee is currently working as an Associate Professor in the Department of Oral and Maxillofacial Surgery at Kyung Hee University Dental Hospital at Gangdong (Kyung Hee Neo Medical Center).

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