

## Gellan Gum/Gamma-Polyglutamic Acid and Glycerol Compositing Membrane for Guiding Bone Regeneration

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**Abstract :** Periodontal disease, oral cancer relating trauma is the prominent factor devastating bone tissue that is crucial to reestablishing in clinical. As we know, common symptom, osteoporosis, and infection limiting the ability of the bone tissue to recover cause difficulty before implantation therapy. Regeneration of bone tissue is the fundamental therapy before surgical processes. To promote the growth of bone tissue, many commercial products still have sophisticated problems that need to overcome. Regrettably, there is no available material which is apparently preferable for releasing and controlling of loading dosage, or mitigating inflammation. In our study, a hydrogel-based composite membrane has been prepared by using Gellan gum (GG), gamma-polyglutamic acid ( $\gamma$ -PGA) and glycerol with simple sol-gel method. GG is a natural material that is massively adopted in cartilage. Unfortunately, the strength of pure GG film is a manifest weakness especially under simulating body fluidic conditions. We utilize another biocompatible material,  $\gamma$ -PGA as cross-linker which can form tri-dimension structure that enhancing the strength. Our result indicated the strength of pure GG membrane can be obviously improved by cross-linked with  $\gamma$ -PGA (0.5, 0.6, 0.7, 0.8, 0.9, 1.0 w/v%). Besides, blending with glycerol (0, 1.0, 2.0, 3.0 w/v%) can significantly improve membrane toughness that corresponds to practical use. The innovative compositing hydrogel made of GG,  $\gamma$ -PGA, and glycerol is attested with neat results including elongation and biocompatibility that take the advantage of extension covering major trauma. Recommendations are made for treatment to build up the foundation of bone tissue that would help patients to escape from the suffering and shorten the amount of time in recovery.

**Keywords :** bone tissue, gellan gum, regeneration, toughness

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