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INTRODUCTION: Natural polymer-based nanofibrous structures promote cell adhesion and proliferation due to their high surface area/volume ratio, high porosity, and similarity to native extracellular matrix in terms of both chemical composition and physical structure [1]. Gum tragacanth (Tg) is a natural polysaccharides obtained from plants. It is a biocompatible, biodegradable and anionic polysaccharides that has been used extensively as an emulsifier in food and pharmaceutical industries [2]. Despite, its good rheological properties and compatibility, the potential biomedical applications of Tg have not been fully investigated. The objective of the present study was to explore the feasibility of combining Tg with gelatin to fabricate a scaffold that serves as a simple collagen-glycosaminoglycans analog for tissue engineering applications, e.g. as a scaffold for human skin epithelial cells.

METHODS: Tg/gelatin nanofibrous scaffolds were prepared using electrospinning techniques. Tg/gelatin was prepared by blending 10 wt% gelatin (in glacial acetic acid, and co-solvent) and 2 wt% Tg (in water). The fibres were then crosslinked to stabilize them.

RESULTS & DISCUSSION: SEM images revealed that the Tg/gelatin nanofibers were highly uniform with mean diameter of 74 ± 21 nm (Fig. 1). The nanofiber meshes were stable up to 7 days incubation in water (Fig. 2). The stability of the crosslink nanofiber was confirmed by monitoring the dissolution of gelatin from the nanofibers using BCA assay. No significant gelatin dissolution was measured in the supernatant, indicating that the crosslinked nanofibers were stable. Our results indicated the crosslinked Tg/gelatin had a relatively high degree of crosslinking of 76% with 13.11 free primary amines rather than the untreated mesh with 54.28 free amines, which result to the formation of stable nanofibers. Their performance as scaffolds to support the growth and differentiation of skin cells will be presented.

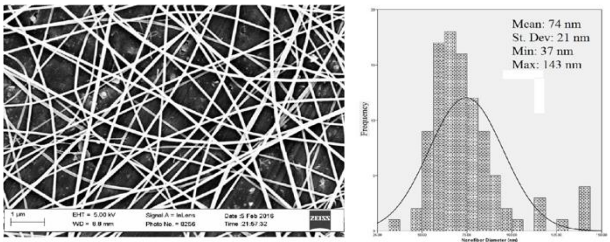

Fig. 1: The SEM images of Tg/gelatin nanofibers and its diameter distribution.

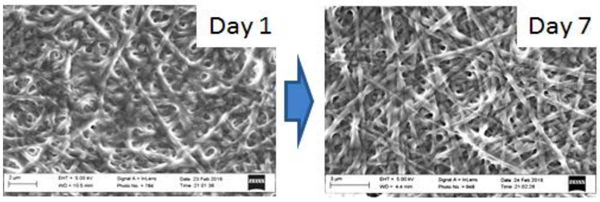

Fig. 2: *The SEM images of Tg/gelatin nanofibers after incubation in water between day 1 and day 7.*

CONCLUSIONS: We developed a stable crosslinked ultrathin Tg/gelatin nanofibrous scaffold. The morphology, fiber diameter and crosslink efficiency of the Tg/gelatin meshes were characterized. The crosslinked nanofiber showed high structural stability after incubation in water up to 7 days. We will explore this highly stable nanofibrous scaffold to support cell attachment, proliferation and subsequent tissue regeneration. The Tg/gelatin nanofiber scaffold combines the advantages of highly flexible, porous and ultrathin properties and is a promising candidate for future development of skin patchs for regenerative medicine.

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