

Comparison of crosslinking reagent and platelet-rich plasma therapeutic efficacies on biomechanical functions and biochemistry properties of degraded intervertebral disc– An *ex vivo* study using whole organ culture system

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Intervertebral disc (IVD) is the biggest avascular cartilaginous tissue between two vertebrae of human spine. Its major function is to resist external loads and absorb shock energy of daily activities. Matrix degradation resulted from degenerative pathologies compromises IVD function and induces painful symptoms. Injection of crosslinking reagent or platelet-rich plasma has been proposed as potential treatment for IVD degeneration. Genipin is a natural crosslinking reagent capable of augmenting IVD integrity by formations of crosslinking between peptides. Platelet-rich plasma can increase disc cell viability and promote matrix synthesis, especially of proteoglycan and type II collagen. A successful therapy for IVD degeneration should be capable of recovering both biomechanical functions and biochemical properties of IVD. However, the effect of either crosslinking reagent or platelet-rich plasma on IVD regeneration has not been completely evaluated yet. Therefore, the purpose of this study is to compare therapeutic efficacies of these two treatments on biomechanical functions and biochemical properties of degraded IVDs. In this study, porcine IVDs were harvested from 6-month old pigs and degraded by trypsin injection. After matrix degradation, the IVD was injected with either crosslinking reagent or platelet-rich plasma injection and then incubated in an in-house whole organ culture system with application of diurnal loadings for 7 days. After incubation, the biomechanical functions, including stiffness and shock attenuation capability, and biochemical properties of IVD, i.e., content of proteoglycan and DNA within IVD matrix, were measured.

Biography

Ya-Wen Kuo has completed her doctoral program in 2010 under supervision of Prof. Jaw-Lin Wang from National Taiwan University. Her research specialties include spine biomechanics, intervertebral disc rheology and surgical treatment for spine pathologies. She published papers in reputed scientific journal, such as Spine and Journal of Biomechanics, as well as international conferences, ex. annual meeting of Orthopedic Research Society. She is now a postdoctoral researcher in biomechanical laboratory host by Prof. Jaw-Lin Wang, and works on the molecular therapies for disc degeneration.

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