nanocapsules by ultrasonic emulsification technology for oral administration. The determination of the final prescription and preparation technology of the nanocapsule were optimized by making the particle size and encapsulation efficiency as evaluating indicator. The achieved drug loaded PLGA nanocapsules and drug loaded complex PEG-PLGA nanocapsules prepared by optimized prescription showed coincident appearance of pale milky blue light, with particle diameter 115.2 nm and 113.8 nm, encapsulation rate 49.64% and 48.86 respectively. These two kinds of drug loaded nanocapsules were of uniform particle size and regular spherical appearance. In the release experiments, the drug loaded PEG-PLGA nanocapsules showed lower drug burst release in the early stage. In pharmacodynamics experiments, the PEG-PLGA nanocapsules exhibited a better hypoglycemic activity compared with the PLGA nanocapsules after oral gavage. The constructed exenatide loaded nanocapsules showed good oral hypoglycemic effect.

Keywords: exenatide, nanocapsules, oral administration

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Anti-CD133 antibody loaded bilayer tubular scaffold based on poly(L-lactide-co-caprolactone)/collagen nanofibers and nanoyarns for vascular tissue engineering

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Multilayered tubular scaffolds have promising potential for vascular tissue engineering. Electrospinning was popularly used for scaffold fabrication to obtain fibers from nano size to micro size [1]. Anti-CD133 antibody was commonly used for surface immobilization on scaffolds for endothelial progenitor cells (EPCs) capture [2]. Besides, smooth muscle cells (SMCs) growth and penetration played a critical role in maintaining vascular wall and providing mechanical strength [3]. To develop a three-dimensional scaffold possessing the potential of EPCs recruitment and SMCs migration, a bilayer scaffold based on poly(L-lactide-co-caprolactone)/collagen (P(LLA-CL)/COL) nanofibers and nanoyarns was designed in this study. Fig. 1A presents bilayer scaffold morphology and structure. The anti-CD133 antibody loaded P(LLA-CL)/COL nanofibers were dense in inner layer, and the TEM image confirmed the core-shell structure. EPCs spread better on the nanofibers, where EPCs had superior intercellular interaction and formed a continuous cells monolayer (Fig. 1B). The outer layer consisted of porous P(LLA-CL)/COL nanoyarns, and SMCs migrated through the whole scaffold from one side to another side (Fig. 1C), due to the larger porosity and pore size provided by three-dimensional nanoyarns. CD133/BSA release curve showed the sustained release for almost 30 days (Fig. 1D). Hence, the bilayer P(LLA-CL)/COL scaffold was beneficial to EPCs adhesion and SMCs three-dimensional growth, showing the promising potential for vascular tissue regeneration.

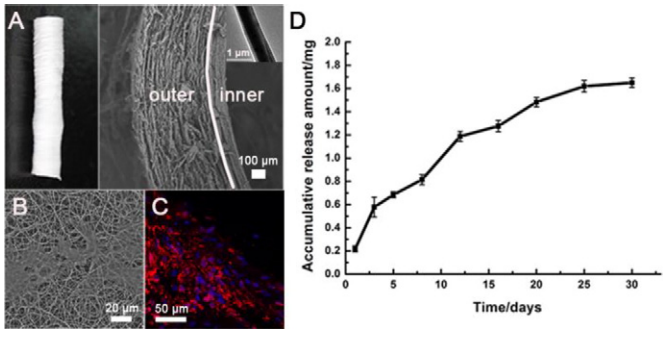

Fig. 1. (A) Digital photo and SEM image of bilayer scaffold, and the insert was TEM image of anti-CD133 antibody loaded nanofiber; (B) SEM image of EPCs growth on the inner surface; (C) fluorescence image of SMCs penetration into outer layer; (D) CD133/BSA release curve.

Keywords: P(LLA-CL), collagen, nanofibers, nanoyarns, bilayer vascular scaffold

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Evaluation on the anti-oxidation effects of a thermosensitive chitosan-based hydrogel loaded antioxidin-RL

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Antioxidin-RL, a small antioxidant peptide from the skin secretions of amphibian *Rana pleuraden*, consists of 14 amino acids including a single cysteine residue, which can fast scavenge free radicals and protect the skin damage against sunlight and UV [1]. The highly porous thermosensitive hydrogel CS-α,β-GP, prepared with CS and α,β-glycerophosphate (α,β-GP), showed the feasibility as a 3D culture system. With interconnected pores, it could be used as a good release system for peptide drugs [2].

Present study aims at constructing CS-α,β-GP for controlled release of antioxidin-RL (Fig. 1). The constructed antioxidin-RL loaded hydrogel (RL-GP) showed an obvious sustained releasing profile of the antioxidin-RL. To evaluate the protection and therapy of RL-GP, immature rat ultraviolet injury models were used. Results showed that RL-GP had a very good ability to scavenge the oxidation pressure caused by free radicals. Catalase (CAT) and total anti-oxygenic capacity (T-AOC) activities were detected. The RL-GP (1 mg/ml) showed strong antioxidant capacity for CAT and T-AOC in mice full thickness skins. The skin tissue injury was detected by H.E. staining. Comparing with the control group, skin damage of RL-GP group was obviously reduced as judged by skin tissue slices observation. No significant shedding of the cuticle, the normality of epidermis, the uniform distribution of the fibers, or fracture and derangement phenomenon was observed in RL-GP group. We