

Название публикации:

Composite tendon implant based on nanofibrillar polyhydroxybutyrate and polyamide filaments

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Наименование журнала:

Journal of Biomedical Materials Research - Part A

Volume 106, Issue 10, October 2018, Pages 2708-2713

Аннотация:

The composite material based on reinforcement of polyamide filaments enclosed by a nonwoven matrix of nanoscaled bioresorbable poly(3-hydroxybutyrate) fibers was developed for application as an artificial ligament implant. The aim of this study was to investigate biodegradability and biocompatibility of the developed implant, as well as its stress–strain properties. The study results show the polyamide core of the implant has stress–strain properties comparable with a natural ligament. Simultaneously, the polyhydroxybutyrate external layer provides high biocompatibility and bioresorbability of the developed implant. The material has proven to be effective under in vivo tests with experimental rats as a ligament replacement for damaged Achilles tendons. Due to cell attachment and growth on the fibrous matrix during 5 weeks postsurgery, regenerated connective tissue was formed substituting for the polymeric implant, which confirmed its efficiency in contrast to the polyamide filament implant with a much longer resorption time. The results obtained indicate application prospects of polyamide-polyhydroxybutyrate implants for reconstructive surgery. © 2018 Wiley Periodicals, Inc. J Biomed Mater Res Part A: 106A: 2708–2713, 2018. © 2018 Wiley Periodicals, Inc.

Ключевые слова:

Biocompatibility, Biodegradability, Collagen, Electrospinning, Tendons, Weaving