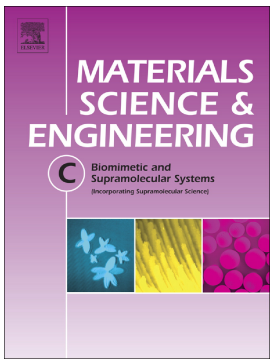

Transparent biocompatible wool keratin film prepared by mechanical compression of porous keratin hydrogel

Hideki Mori, Masayuki Hara

PII: S0928-4931(17)33300-3
DOI: doi:10.1016/j.msec.2018.05.021
Reference: MSC 8576

To appear in: *Materials Science & Engineering C*

Received date: 18 August 2017
Revised date: 12 April 2018
Accepted date: 5 May 2018

Please cite this article as: Hideki Mori, Masayuki Hara , Transparent biocompatible wool keratin film prepared by mechanical compression of porous keratin hydrogel. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Msc(2017), doi:10.1016/j.msec.2018.05.021

Transparent biocompatible wool keratin film prepared by mechanical compression of porous keratin hydrogel

Hideki Mori, Masayuki Hara *

Department of Biological Science, Graduate School of Science, Osaka Prefecture University, 1-2 Gakuen-cho, Naka-ku, Sakai, Osaka 599-8570, Japan

* Corresponding author. Tel./Fax: +81 72 254 9842.
E-mail address: hara@b.s.osakafu-u.ac.jp (M. Hara).

Keywords:
Keratin; Wool; Transparent; Biocompatible; Film

Abstract

We could prepare a transparent wool keratin film by mechanical compression of the keratin hydrogel, which was prepared by our method previously reported. Optical transmittance of the keratin film was approximately 70% at 400 nm and 80% at 550 nm. The keratin film had higher mechanical strength than the keratin hydrogel estimated from the tensile test. Young's modulus of the keratin film and that of keratin hydrogel were 0.582 $\pm$ 0.294MPa and 0.041 $\pm$ 0.008 MPa, respectively. We evaluated degradability of keratin film by tryptic digestion *in vitro* and that also by implantation test *in vivo*. The keratin film showed slower degradation rate in the presence of trypsin *in vitro*, and also that as a subcutaneous implant in mouse *in vivo*. Biocompatibility is also a key factor for application of keratin as biomaterials. Within several days after subcutaneous implantation of the sample in mouse, an apparent symptom of acute inflammation of tissues, such as swelling of the reddish skin, was not observed. Keratin film remained in the original morphology of sheet-like structure while keratin hydrogel was degraded with many cracks and gaps after implantation for several weeks. We concluded from those results that keratin film was mostly biocompatible without provoking