11th International Conference
on Advanced Materials
Rio de Janeiro Brazil
September 20 - 25
ICAM2009

OBTAINMENT AND CHARACTERIZATION OF COLLAGEN MATRICES FOR SOFT TISSUE USES

V. A. S. Vulcani[(1)*], D. G. Macoris[(2)], A. M. G. Plepis[(3)], V. S. Franzo[(4)]

(1) UFRPE - UAST, Universidade Federal Rural de Pernambuco, e-mail: vulcani@uast.ufrpe.br
(2) Department of Clinic and Surgery – FCAV – Unesp – Jaboticabal – São Paulo, Brasil.
(3) Department of Molecular Physical Chemical - IQSC – Universidade de São Paulo – São Carlos – São Paulo, Brasil.
(4) UFT, Universidade Federal de Tocantins – Araguaína – Tocantins, Brasil
* Corresponding author.

Abstract – Synthetic materials and autologous tissues are used in large tissue defects but treated heterologous collagen materials are a cheap and useful alternative. In this study were obtained and characterized homolog tendineous diaphragmatic centers treated in alkaline solution at different times (24, 48, 72, 120 and 144 hours). The studied parameters showed that the alkaline treatment is a promissory method to obtain biomembranes potentially helpful in surgery and was concluded that the treatment for 72 hours is the most indicated for the surgical implantation.

Soft tissue defects resulting from tumor resection or trauma require surgery to restore the body's contours. Because autologous tissues or synthetic implant reconstructions can be less than ideal, engineered tissues produced *in vitro* are being developed as alternatives. Modified natural tissues have been proposed for this application because they are biocompatible and can be shaped to fill a specific defect. The objective of this study was to obtaining biomembranes from equines tendineous diaphragmatic centers (TDC) submitted to alkaline solutions at different times. Nine TDC were obtained from dead or euthanized equines in the maximum of two hours after dead, except from carriers of contagious disease. Physiological solution 0.9% was used for wash the TDC to maintain for 24 hours.

The samples were treated during 24, 48, 72, 120 and 144 hours in alkaline solution (pH 13) contains chlorides and sulphates of sodium, potassium and calcium for 72 hours. The residues were removed by boric acid 3% and EDTA 3% being the TDC freezing and lyophilized and analyzed the flexibility, viability for suture and homogeneity. After that, the samples and the material *in natura* were characterized by differential scanning calorimetry, scanning electronic microscopy (SEM) and biological stability *in vitro* hydrolysis of collagen by colagenase. The 72 hours alkaline treatment showed be intermediary in relation to flexibility, suture resistance and homogeneity. Differential scanning calorimetry demonstrated that the alkaline treatment did not have denaturated the collagen and SEM images showed that the material expanded with the increase of the time treatment. The biological stability by colagenase decreased with the time treatment. It was concluded that the treatment for 72 hours is the most indicated for the surgical implantation.

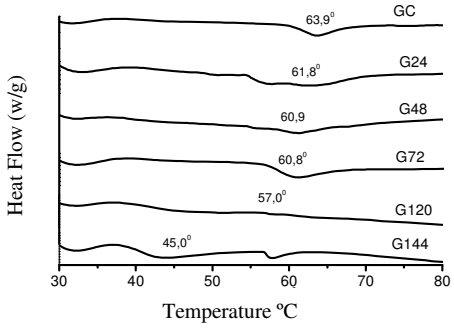

Figure 1: Differential scanning calorimetry of each treatment time (24 to 144 hours) and not treated (GC)

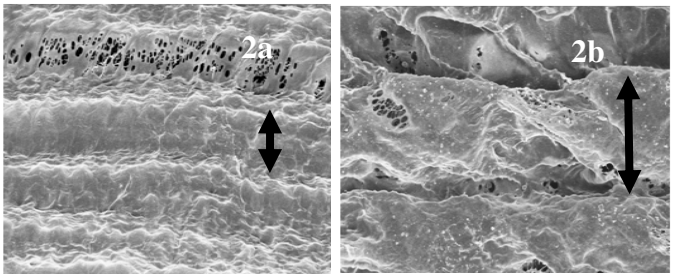

Figure 2: a) Biomembrane not treated in alkaline solution **b)** Biomembrane treated in alkaline solution for 48 hours. The low density zones expanded with the incresead ofh the time treatment (arrows).

References

[1]R.P. SILVERMAN, Plast. And Reconst. Surg., 113 (2004).673675.
[2]C. Lacerda, A.M.G. Plepis and G. Goissis, Quim. Nova. 21 (1998) 267271.