Accepted Manuscript

Biocompatibility, biodegradation and excretion of polylactic acid (PLA) in medical implants and theranostic systems

Dana da Silva, Maya Kaduri, Maria Poley, Omer Adir, Nitzan Krinsky, Janna Shainsky-Roitman, Avi Schroeder

PII: S1385-8947(18)30010-X
DOI: https://doi.org/10.1016/j.cej.2018.01.010
Reference: CEJ 18330

To appear in: *Chemical Engineering Journal*

Please cite this article as: D.d. Silva, M. Kaduri, M. Poley, O. Adir, N. Krinsky, J. Shainsky-Roitman, A. Schroeder, Biocompatibility, biodegradation and excretion of polylactic acid (PLA) in medical implants and theranostic systems, *Chemical Engineering Journal* (2018), doi: https://doi.org/10.1016/j.cej.2018.01.010

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Mini Review

Biocompatibility, biodegradation and excretion of polylactic acid (PLA) in medical implants and theranostic systems

Dana da Silva[1], Maya Kaduri[1], Maria Poley[1], Omer Adir[1,2], Nitzan Krinsky[1,3], Janna Shainsky-Roitman[1] and Avi Schroeder[1*]

[1] *Laboratory for Targeted Drug Delivery and Personalized Medicine Technologies, Department of Chemical Engineering, Technion – Israel Institute of Technology, Haifa 32000, Israel*

[2] *The Norman Seiden Multidisciplinary Program for Nanoscience and Nanotechnology, Technion – Israel Institute of Technology, Haifa 32000, Israel*

[3] *The Interdisciplinary Program for Biotechnology, Technion – Israel Institute of Technology, Haifa 32000, Israel*

[*]Corresponding author: Phone: +972-778871953, avids@technion.ac.il

Abstract. Polylactic acid (PLA) is the most commonly used biodegradable polymer in clinical applications today. Examples range from drug delivery systems, tissue engineering, temporary and long-term implantable devices; constantly expanding to new fields. This is owed greatly to the polymer's favorable biocompatibility and to its safe degradation products. Once coming in contact with biological media, the polymer begins breaking down, usually by hydrolysis, into lactic acid (LA) or to carbon dioxide and water. These products are metabolized intracellularly or excreted in the urine and breath. Bacterial infection and foreign-body inflammation enhance the breakdown of PLA, through the secretion of enzymes that degrade the polymeric matrix.

The biodegradation occurs both on the surface of the polymeric device and inside the polymer body, by diffusion of water between the polymer chains.

Download English Version:

https://daneshyari.com/en/article/6579937

Download Persian Version:

https://daneshyari.com/article/6579937

Daneshyari.com