

Accepted Manuscript

Title: Multifunctional laminarin microparticles for cell adhesion and expansion

Authors: C.R. Martins, C.A. Custódio, J.F. Mano

PII: S0144-8617(18)30927-5
DOI: <https://doi.org/10.1016/j.carbpol.2018.08.029>
Reference: CARP 13926



To appear in:

Received date: 5-6-2018
Revised date: 7-8-2018
Accepted date: 8-8-2018

Please cite this article as: Martins CR, Custódio CA, Mano JF, Multifunctional laminarin microparticles for cell adhesion and expansion, *Carbohydrate Polymers* (2018), <https://doi.org/10.1016/j.carbpol.2018.08.029>

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.

Multifunctional laminarin microparticles for cell adhesion and expansion

Martins CR,¹ Custódio CA,^{1*} Mano JF^{1*}

1-Department of Chemistry, CICECO, Aveiro Institute of Materials, University of Aveiro Campus
Universitário de Santiago, 3810-193 Aveiro – Portugal

* Corresponding author.

E-mail address: catarinacustodio@ua.pt, jmano@ua.pt

Highlights

- Methacrylated laminarin was easily processed in monodispersed microparticles using a microfluidic system
- Functional laminarin microparticles were efficient support for cell adhesion and expansion
- With the encapsulation of platelet lysates, the proliferation of cells was enhanced
- Laminarin microparticles could assemble to form structures with packing densities, suggesting potential applications in tissue engineering and regenerative medicine.

Abstract

Microfabrication technologies have been widely explored to produce microgels that can be assembled in functional constructs for tissue engineering and regenerative medicine applications. Here, we propose microfluidics coupled to a source of UV light to produce multifunctional methacrylated laminarin microparticles with narrow distribution of sizes using photopolymerization.

The multifunctional microparticles were loaded with platelet lysates and further conjugated with an adhesive peptide. The adhesive peptides dictated cell adhesiveness to the laminarin microparticles, the incorporation of platelet lysates have resulted in improved cell expansion compared to clear microparticles.

Overall, our findings demonstrate that multifunctional methacrylated laminarin microparticles provide an effective support for cell attachment and cell expansion.

Moreover, expanded cells provide the link for microparticles aggregation resulting in robust 3D structures. This suggest the potential for using the methacrylated laminarin microplatforms capable to be assembled by the action of cells to rapidly produce large tissue engineered constructs.

Download English Version:

<https://daneshyari.com/en/article/10141217>

Download Persian Version:

<https://daneshyari.com/article/10141217>

[Daneshyari.com](https://daneshyari.com)