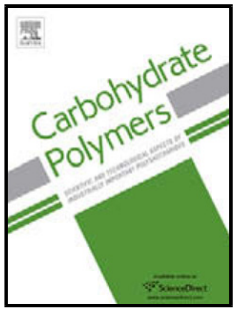

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PII: S0144-8617(18)30927-5
DOI: https://doi.org/10.1016/j.carbpol.2018.08.029
Reference: CARP 13926

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

Multifunctional laminarin microparticles for cell adhesion and expansion

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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.