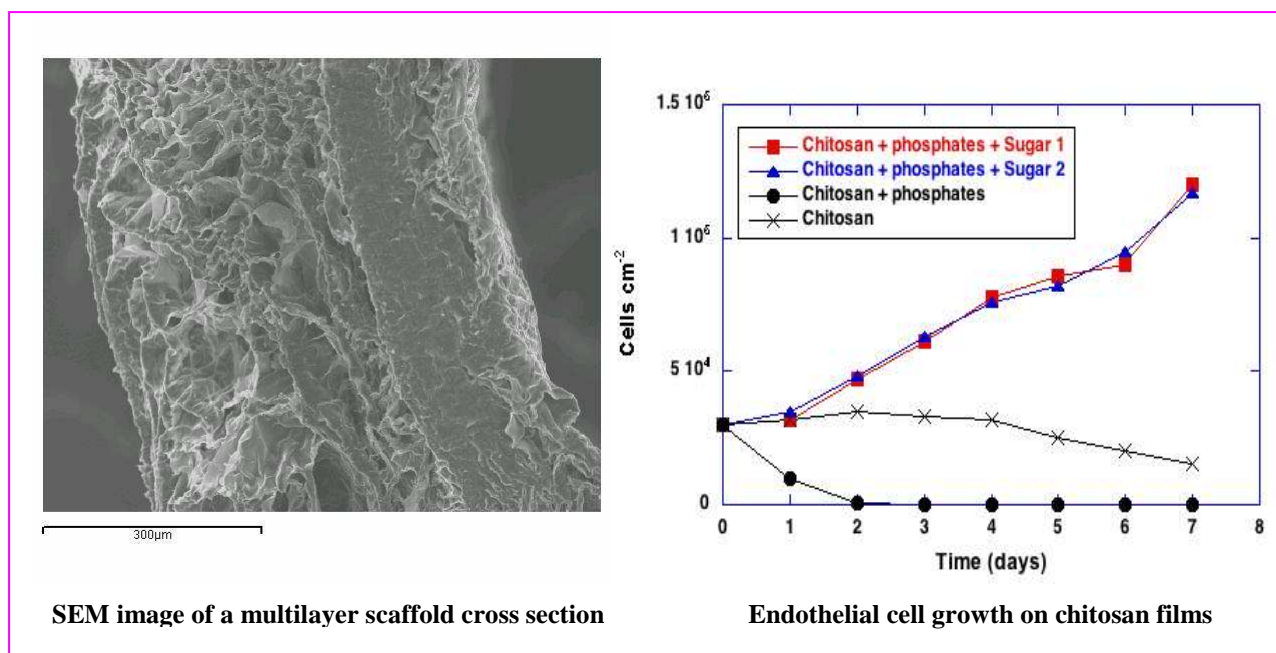


Chitosan scaffold for tissue engineering applications

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The University of Parma has developed a novel biodegradable and highly biocompatible chitosan scaffold intended for tissue engineering applications (regenerative medicine), possessing suitable mechanical resistance and potentially able to act as drug delivery system e.g. for antimicrobial agents, growth factor, etc. The scaffold can be shaped to give rise an insert that can be used for reparation or surgical substitution for treatment of traumatic and degenerative/inflammatory pathologies.



1. Description of the product

The product is represented by stable chitosan hydrogels for the construction of biodegradable, highly cyto- and biocompatible, biodegradable film or 3D scaffolds acting as substrate for the *in vitro-in vivo* growth of different cell histo-type as well as for drug delivery. In particular the gels, that are prepared from chitosan solutions containing polysaccharides, are soft smooth, amorphous and highly hydrophilic materials affording optimal cytocompatibility.

Main applications are envisaged in regenerative medicine.

2. Innovative aspect of the product

The novelty of the product is represented by the optimal biocompatibility obtained by modifying the solid-state characteristics of the chitosan hydrogel without affecting the chemical primary structure and, therefore with low impact to regulatory aspects.

3. Main advantages of the offer

The main advantages of the proposed technology are related to the simplicity of the approach that nevertheless affords very good biocompatibility. The chitosan hydrogel can be shaped to form a 3D scaffold with controlled porosity suitable for the growth of different cell type and to afford three-dimensional tissue organization. Furthermore multilayer structures can be obtained by successive casting of chitosan solution for controlling mechanical and physicochemical characteristics (e.g. permeability, degradation rate).

Beside the application in regenerative medicine, the chitosan scaffold can be exploited as an implantable drug delivery platform.

4. Technology key words

Chitosan, scaffold, tissue engineering, regenerative medicine.

5. Current Stage of Development

Work in progress. Tested in laboratory, test *in vivo* scheduled. Available for demonstration

6. Intellectual Property Rights

The product is covered by an international patent application by University of Parma. Licensing or transfer is available.

Technical and scientific publications

R. Bettini; A. A. Romani; M. M. Morganti; Borghetti, A. F., Physicochemical and cell adhesion properties of chitosan films prepared from sugar and phosphate-containing solutions. *European Journal of Pharmaceutics and Biopharmaceutics* **68**, 74-81 (2008).

A.A. Romani, R. Tozzi, M.M. Morganti, P. Soliani, R. Bettini, A.F. Borghetti, Multilayered chitosan scaffold for bile duct reconstruction. *Biomedicine & Pharmacotherapy* **62**, 491-492 (2008)

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