

Plasma-Coated Polycaprolactone Nanofibers with Covalently Bonded Platelet-Rich Plasma Enhance Adhesion and Growth of Human Fibroblasts

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Journal impact factor

The screenshot displays the MDPI website interface for the journal *Nanomaterials*. At the top, the MDPI logo is on the left, and navigation links for "25th Anniversary", "Journals", "Information", "Author Services", "Initiatives", and "About" are in the center. On the right, there are "Sign In / Sign Up" and "Submit" buttons. Below the navigation is a search bar with the text "Search for Articles:" and input fields for "Title / Keyword", "Author / Affiliation", a dropdown menu set to "Nanomaterials", and "All Article Types". A "Search" button and a link to "Advanced" search are also present.

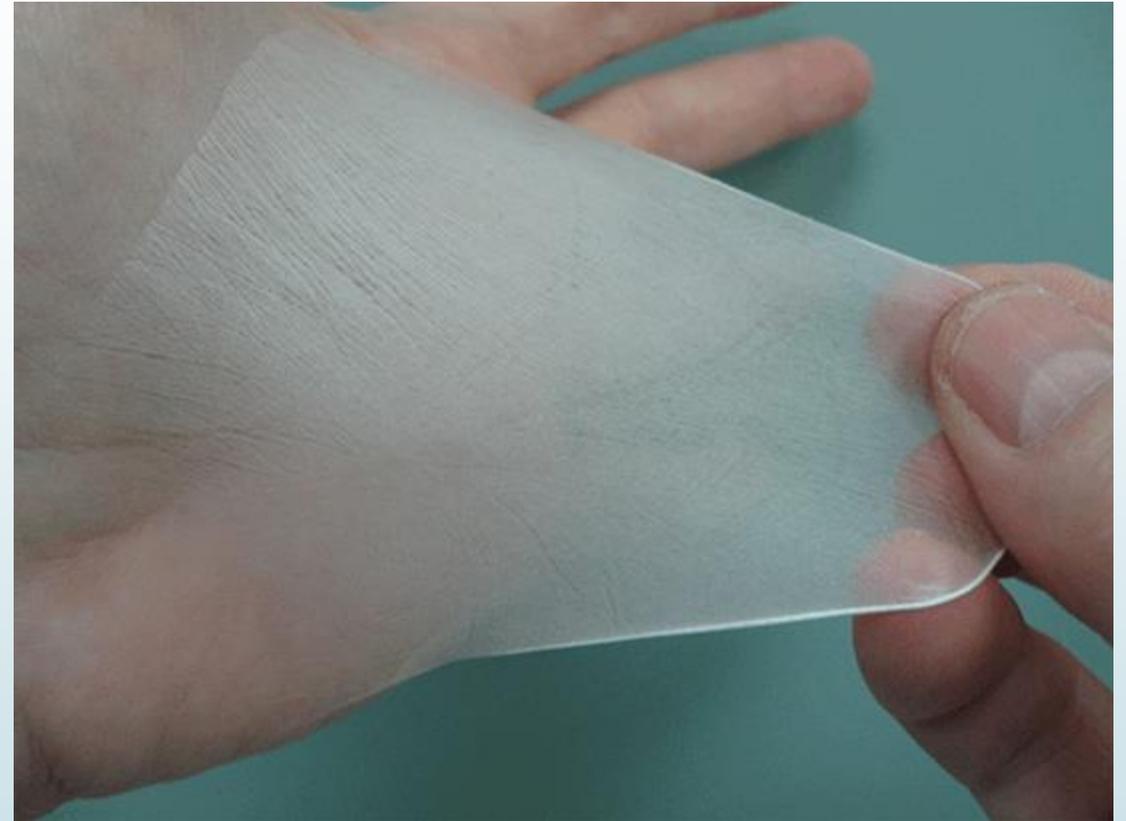
The main content area shows the journal's logo and name, "nanomaterials", with a "Submit to *Nanomaterials*" button, a "Review for *Nanomaterials*" button, and social media sharing options for Twitter and Facebook. A "Journal Menu" is listed on the left, including links to Home, Aims & Scope, Editorial Board, Reviewer Board, Topic Board, Reviewer Board, Editorial Board, Aims & Scope, and an "Open Access" link.

The featured article is titled "Advanced Phase-Change Metasurfaces via a Hybrid Dielectric-Plasmonic Approach". The article cover image shows three graphs of waveforms on a grid background. Below the title, the journal name "Nanomaterials" is displayed, followed by a description: "Nanomaterials is an international, peer-reviewed, open access journal published monthly online by MDPI." A yellow badge indicates an "IMPACT FACTOR 4.324" and a blue badge states "Covered in: PubMed".

On the right side, there is an "E-Mail Alert" section with the text "Add your e-mail address to receive forthcoming issues of this journal:" and an input field for "Enter Your E-Mail Address...". Below this is a "Subscribe" button. A "News" section below the alert mentions "26 May 2021 Meet Us at the 2021 IEEE the 6th Optoelectronics Global Conference (OGC 2021) in Shenzhen, China, 31 August–03 September 2021".

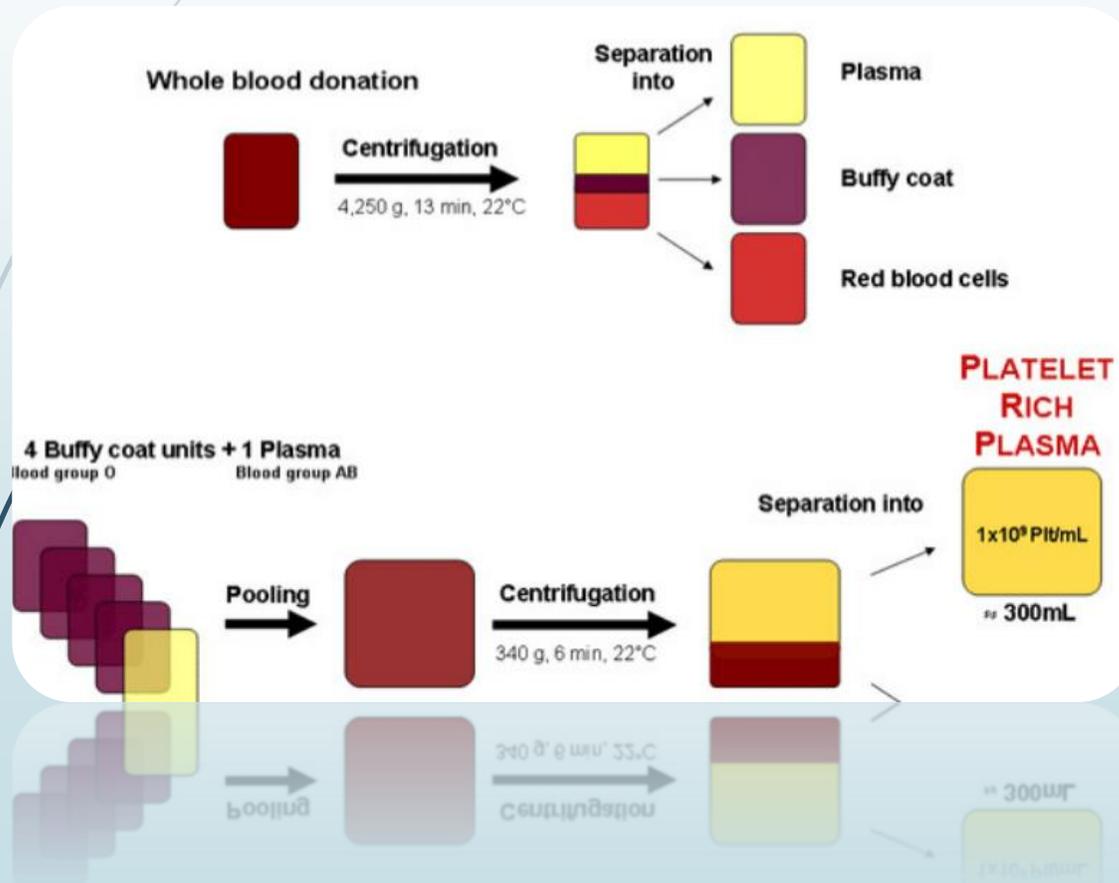
Introduction

- Biodegradable nanofiber
- Enrichment
- PRP



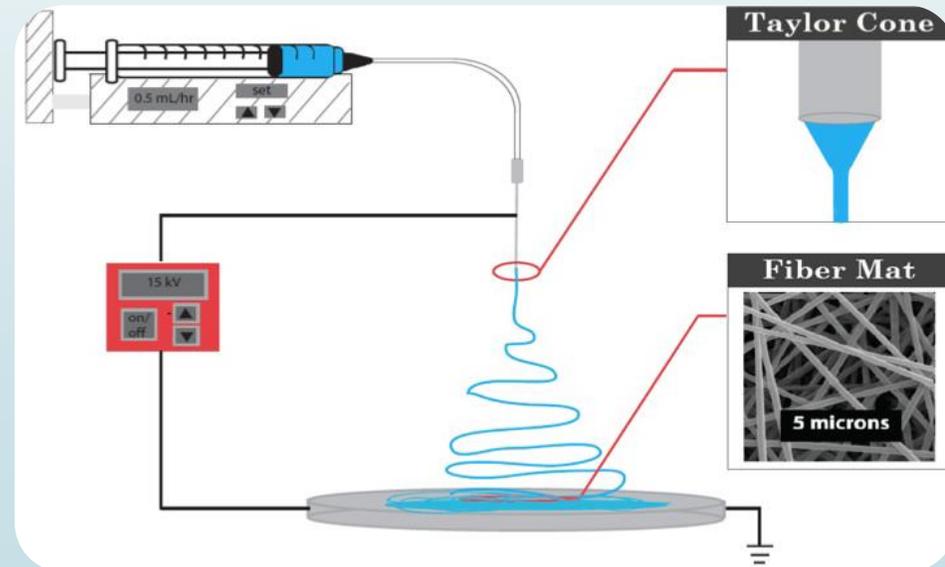
Materials and Methods

- Preparation of Freeze–Thawed Platelet-Rich Plasma



Materials and Methods

- Electrospinning of Nanofibers



Materials and Methods

- Deposition and Characterization of Plasma Polymer Layers

SEM



XPS



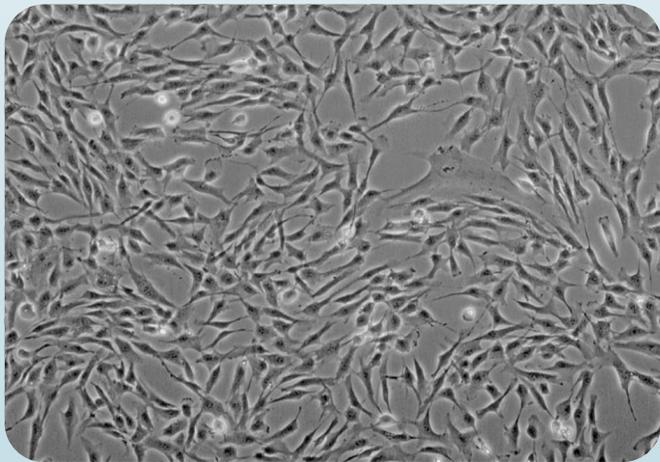
Materials and Methods

- Coating of Scaffolds with PRP
 - a) PCL _ ref
 - b) PCL _ COOH plasma
 - c) PCL _ PRP
 - d) PCL _ COOH_PRP (1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC))



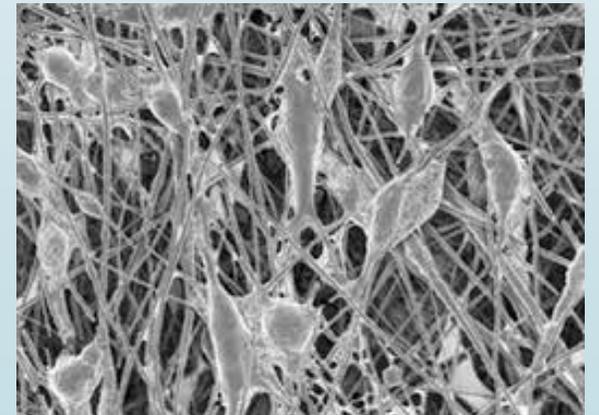
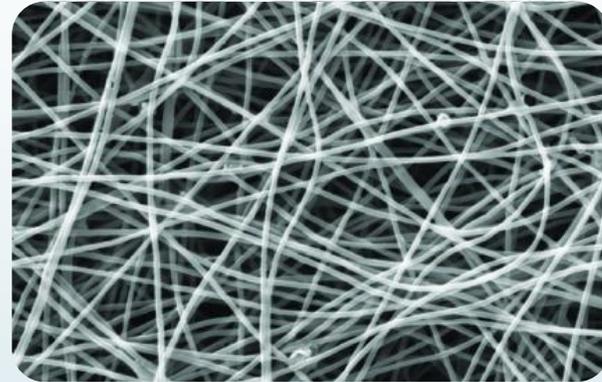
Materials and Methods

- Cell Tests
Human fibroblast cells



- Adhesion Assay

- a) Punch N
- b) Seeding 10000 cells
- c) Fix with 4% paraformaldehyde
- d) visualization of cytoskeleton actin filaments with Alexa Fluor 532 phalloidin
- e) Hoechst 33342



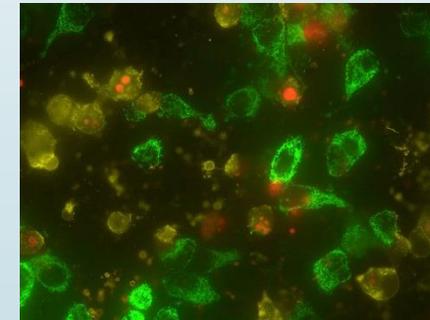
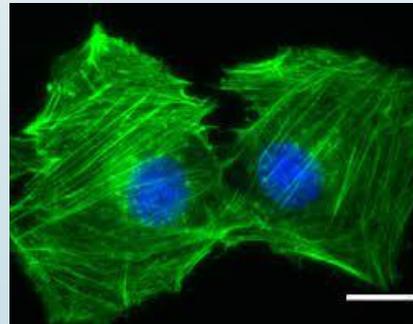
■ Cell Proliferation

- a) Seeding 7000
- b) After third and seventh day
- c) determining the ratio of total cells Hoechst-positive to the EdU-positive cells



■ Cell Apoptosis

- a) Hoechst
- b) the ratio of normal cell nuclei (middle bright and uniformity of Hoechst) to fragmented and brighter nuclei.



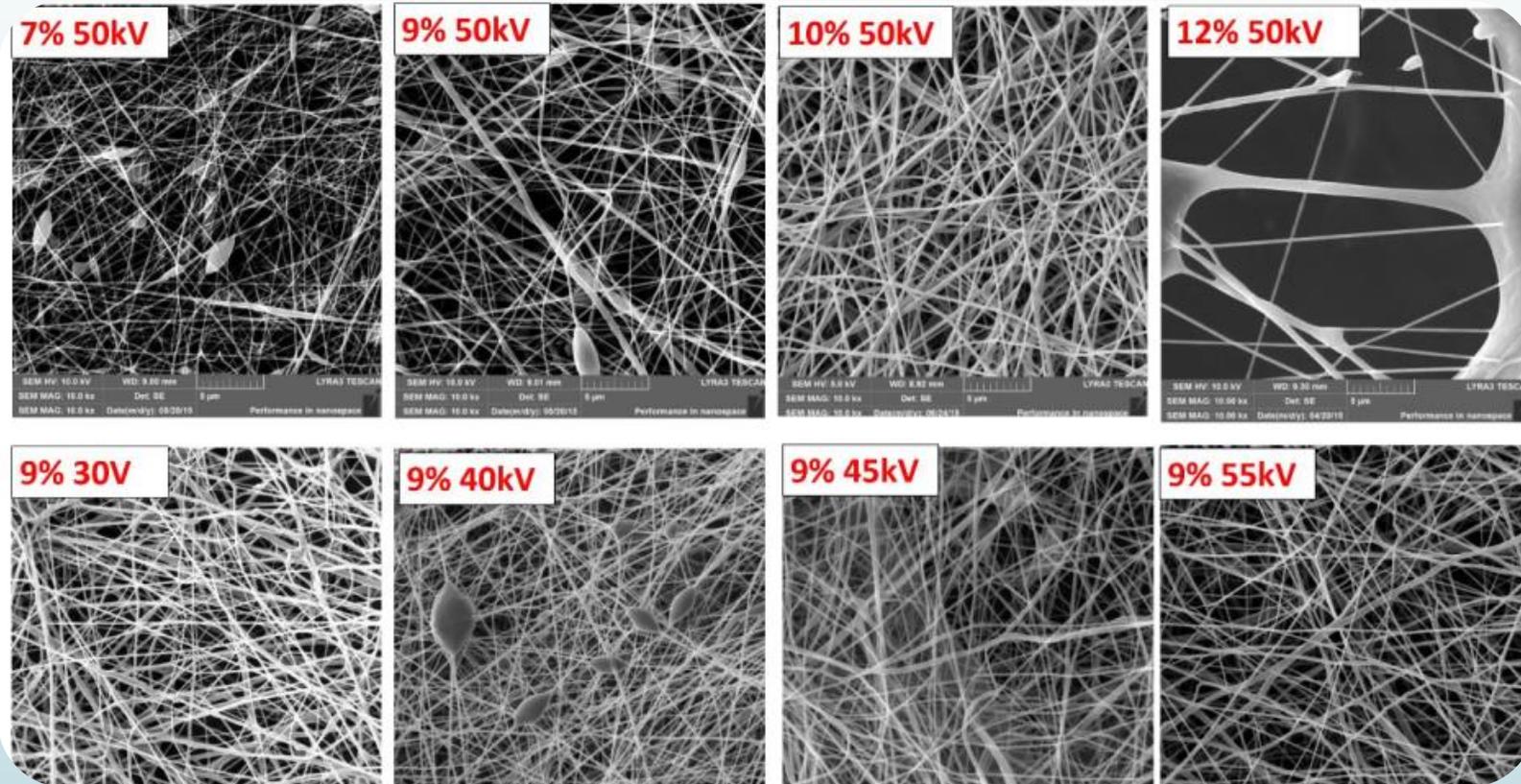
Materials and Methods

- Immunofluorescent Staining of Scaffold Cells

antibodies were used: anti-fibronectin and anti-collagen

Results

□ Optimization of Electrospinning of the PCL Nanofibers



- The effect of PCL concentration and applied voltage

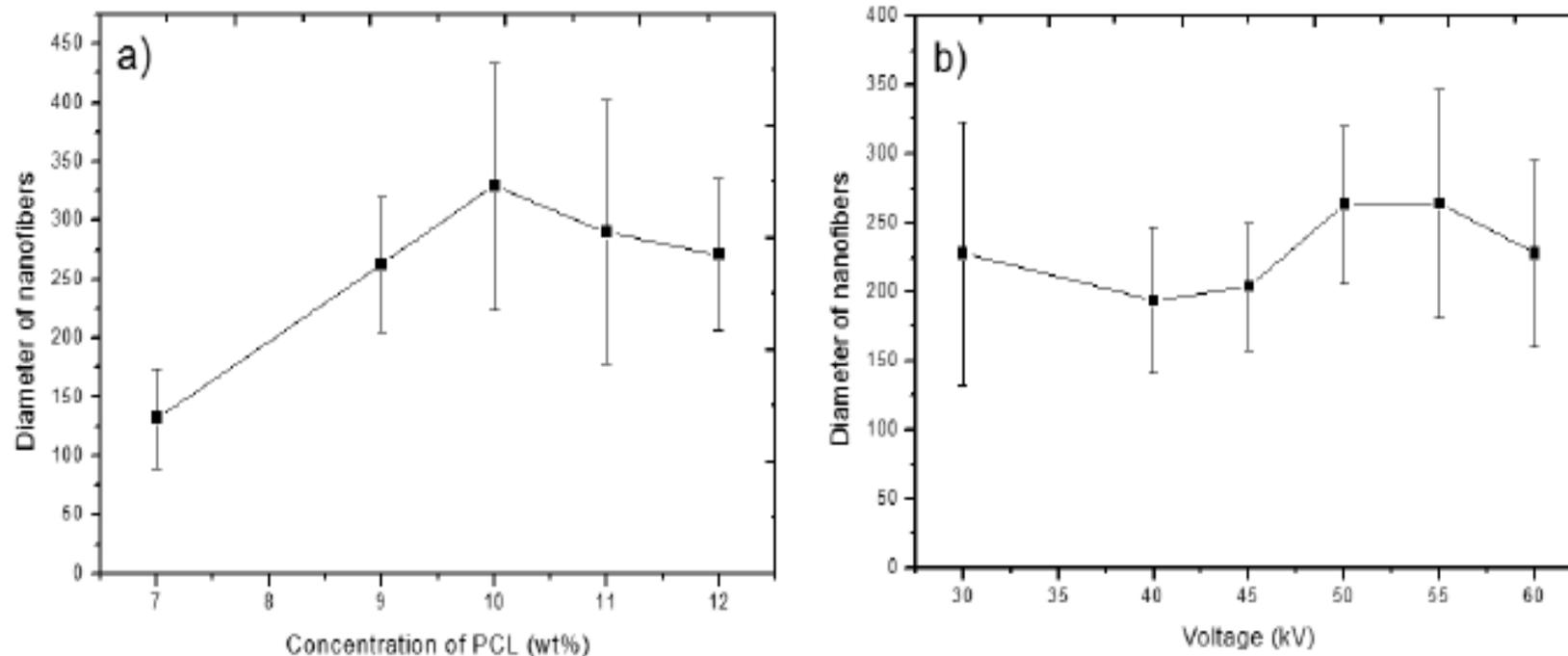
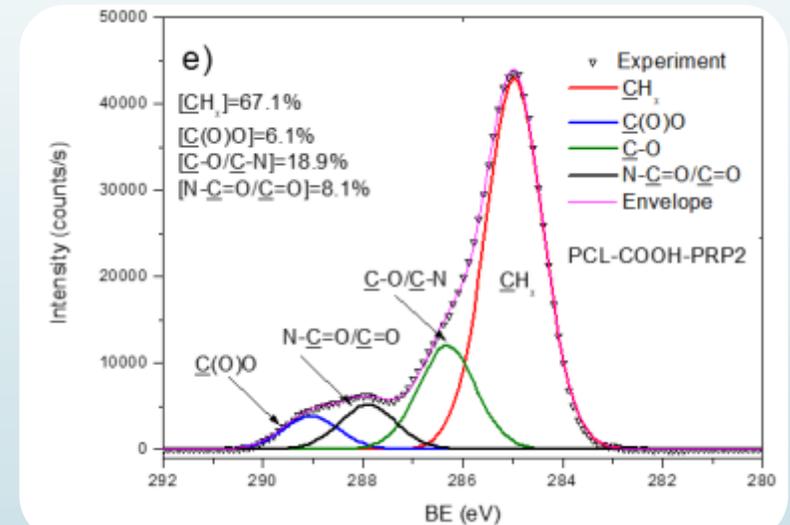
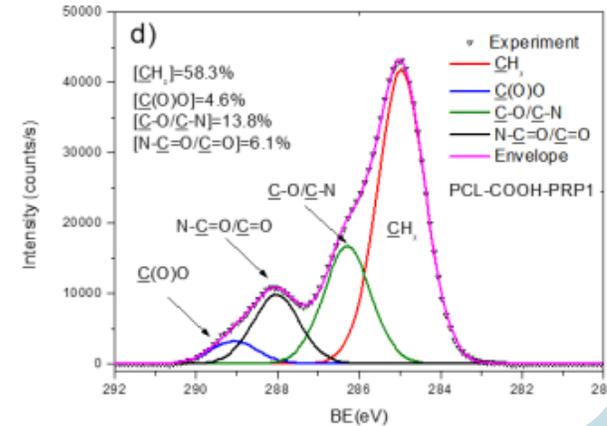
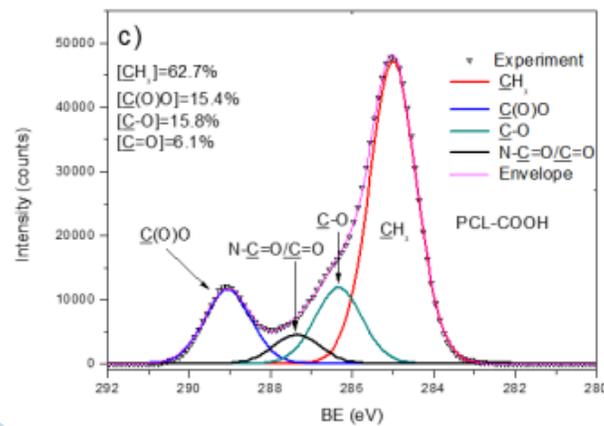
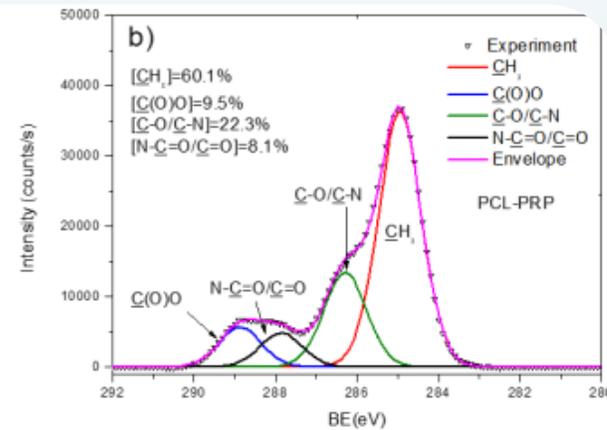
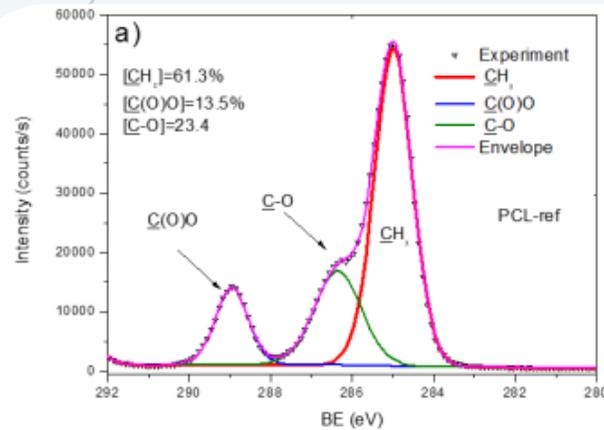


Figure 2. Thickness of resulting PCL nanofibers as a function of the PCL concentration (a) and applied voltage (b) during the electrospinning process. Error bars represent standard deviation of the nanofibers' thickness distribution.

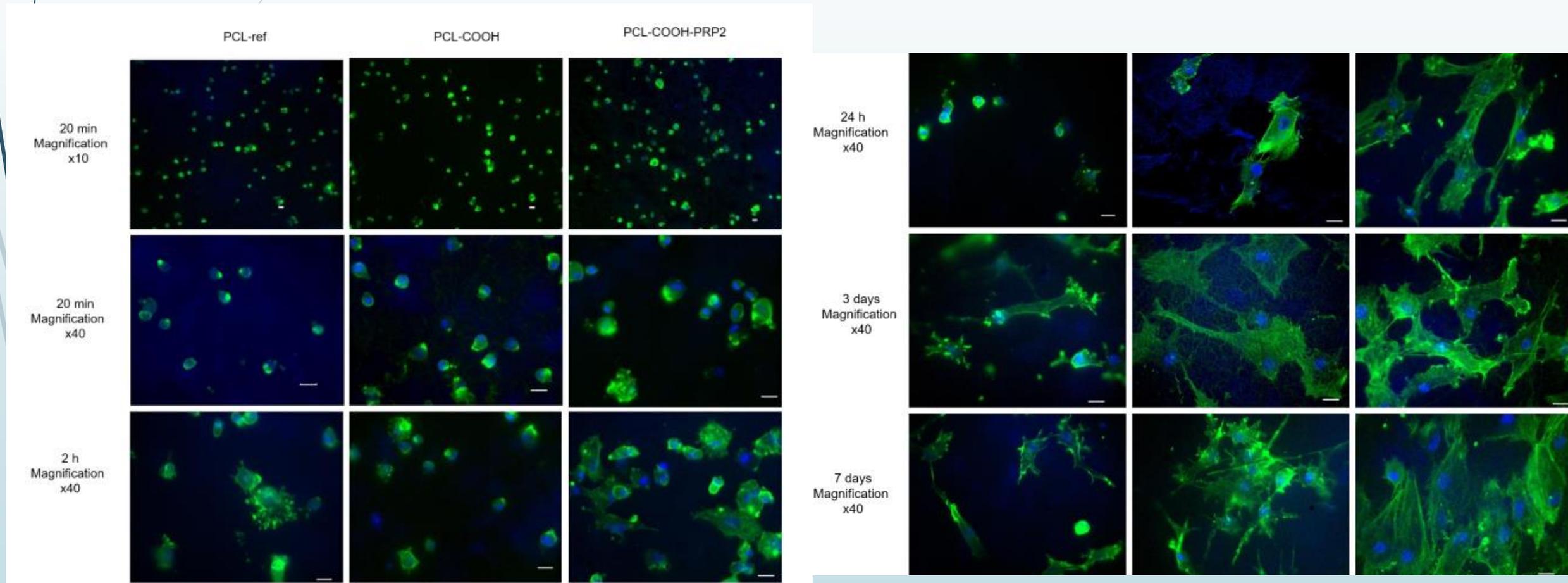
Results

- Surface Characterization of the Samples
 - Water-contact-angle
 - X-ray photoelectron spectroscopy



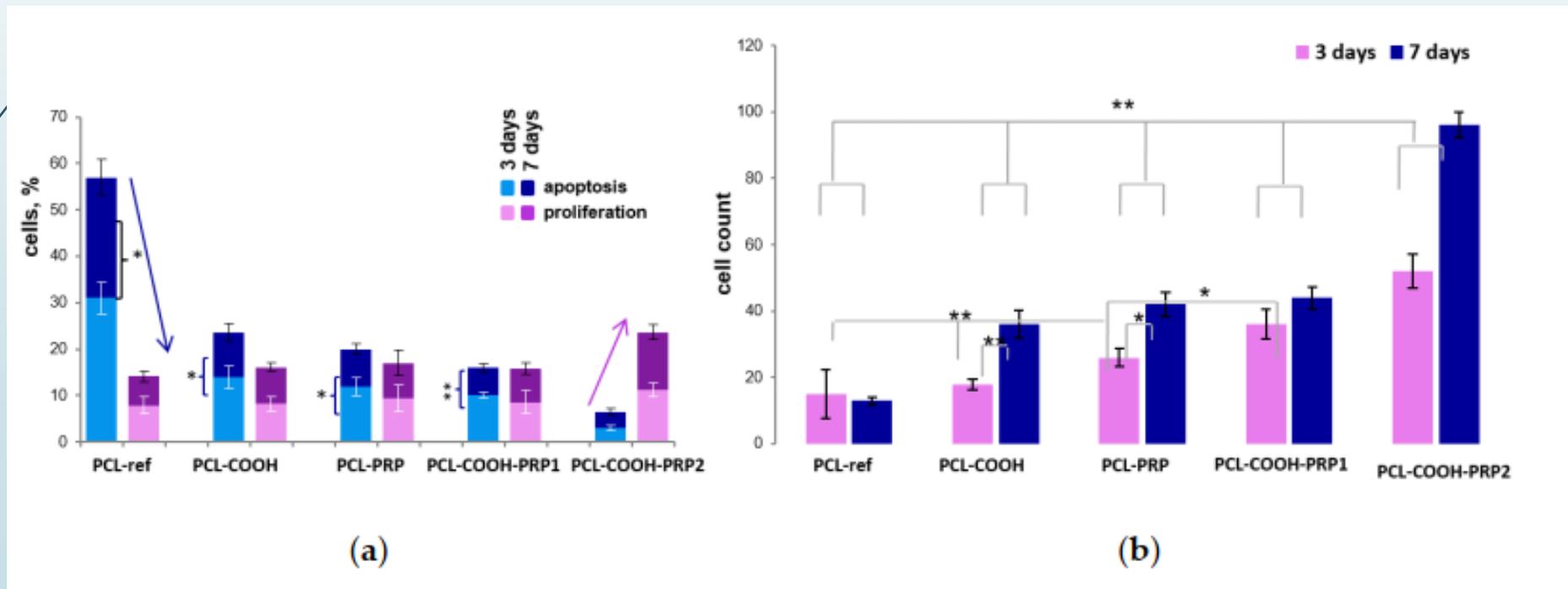
Results

- Adhesion and Spreading of Fibroblasts Seeded on PCL-ref, PCL-COOH, and PCL-COOH-PRP



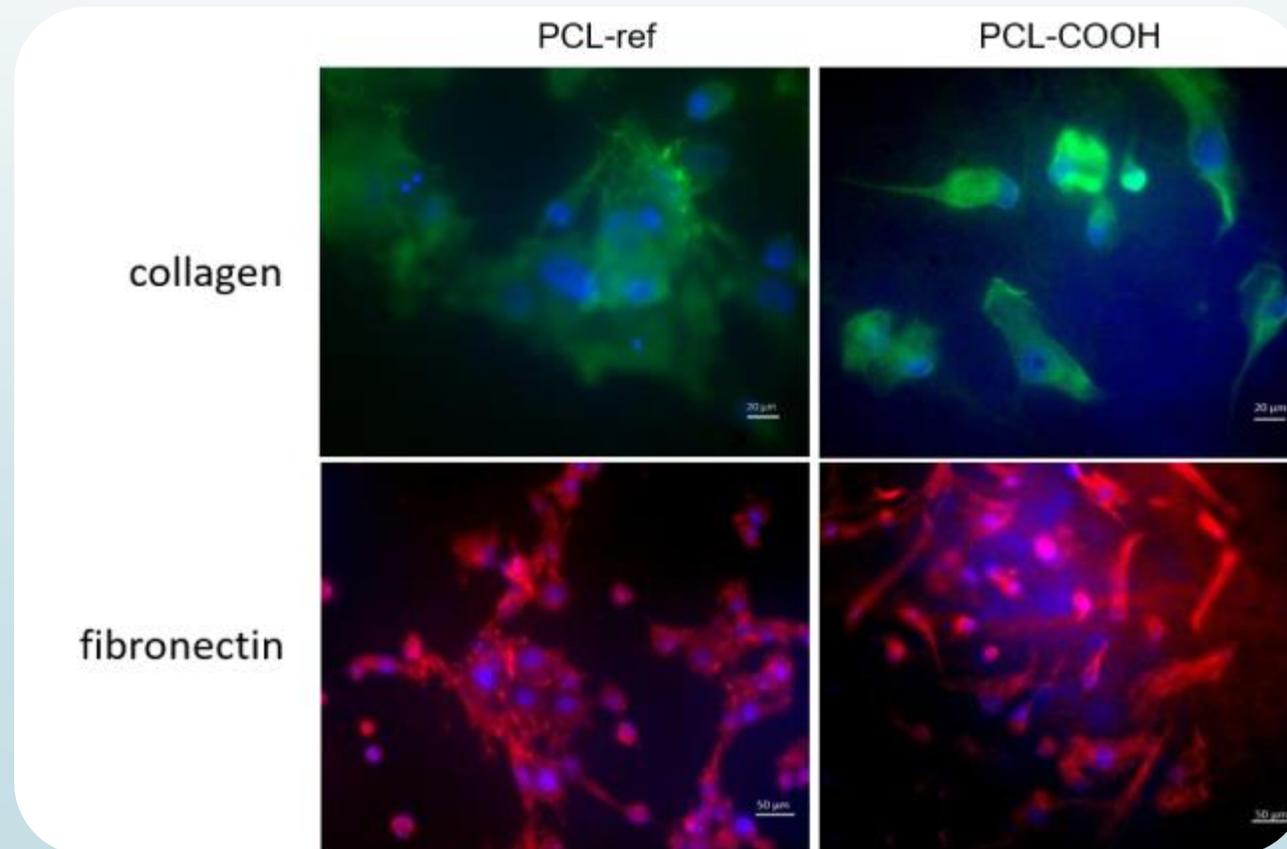
Results

- The Modification of PCL Nanofibers with COOH Groups and Its Effect on Human Fibroblast Proliferation and the Cell Apoptosis



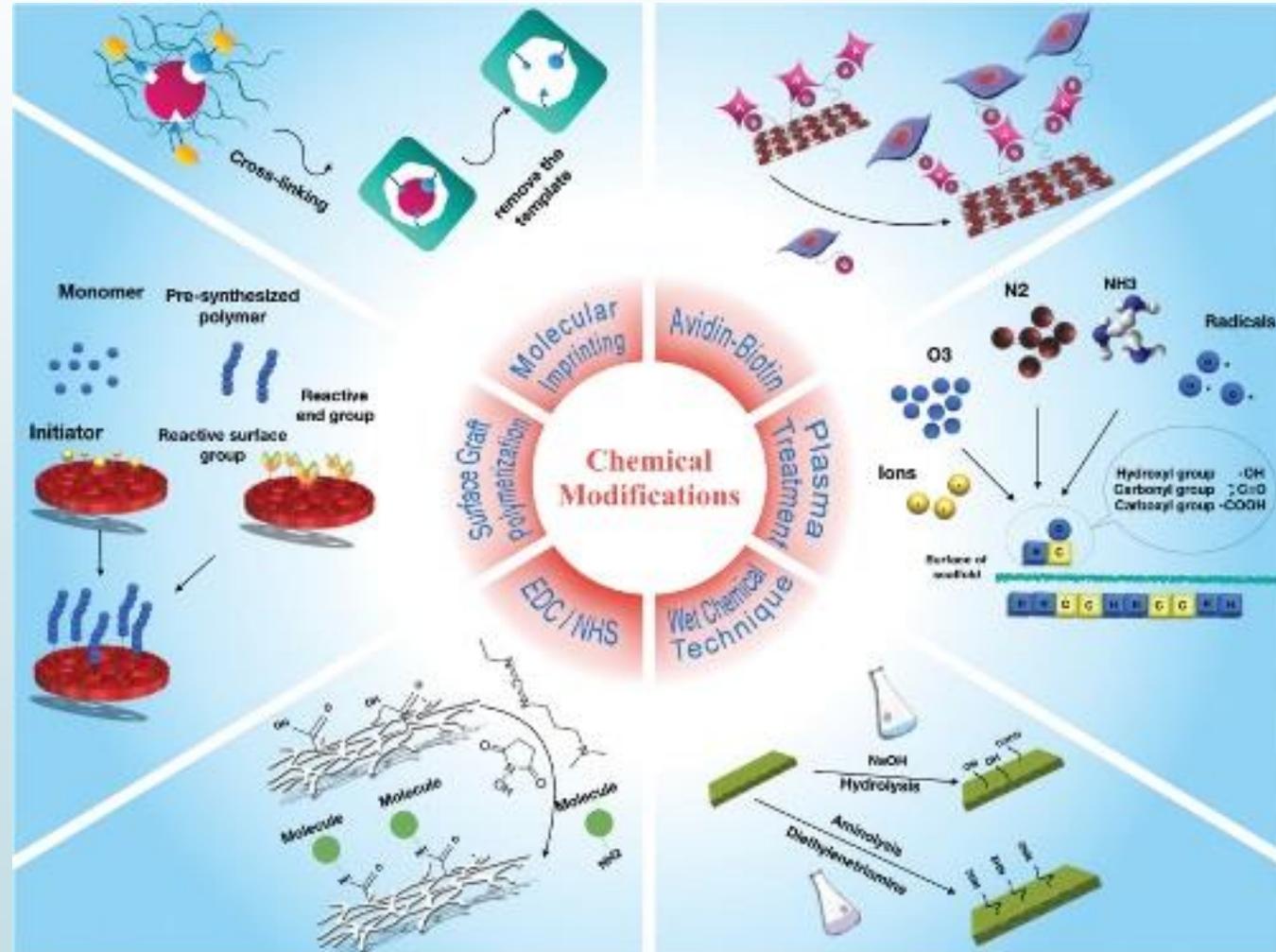
Results

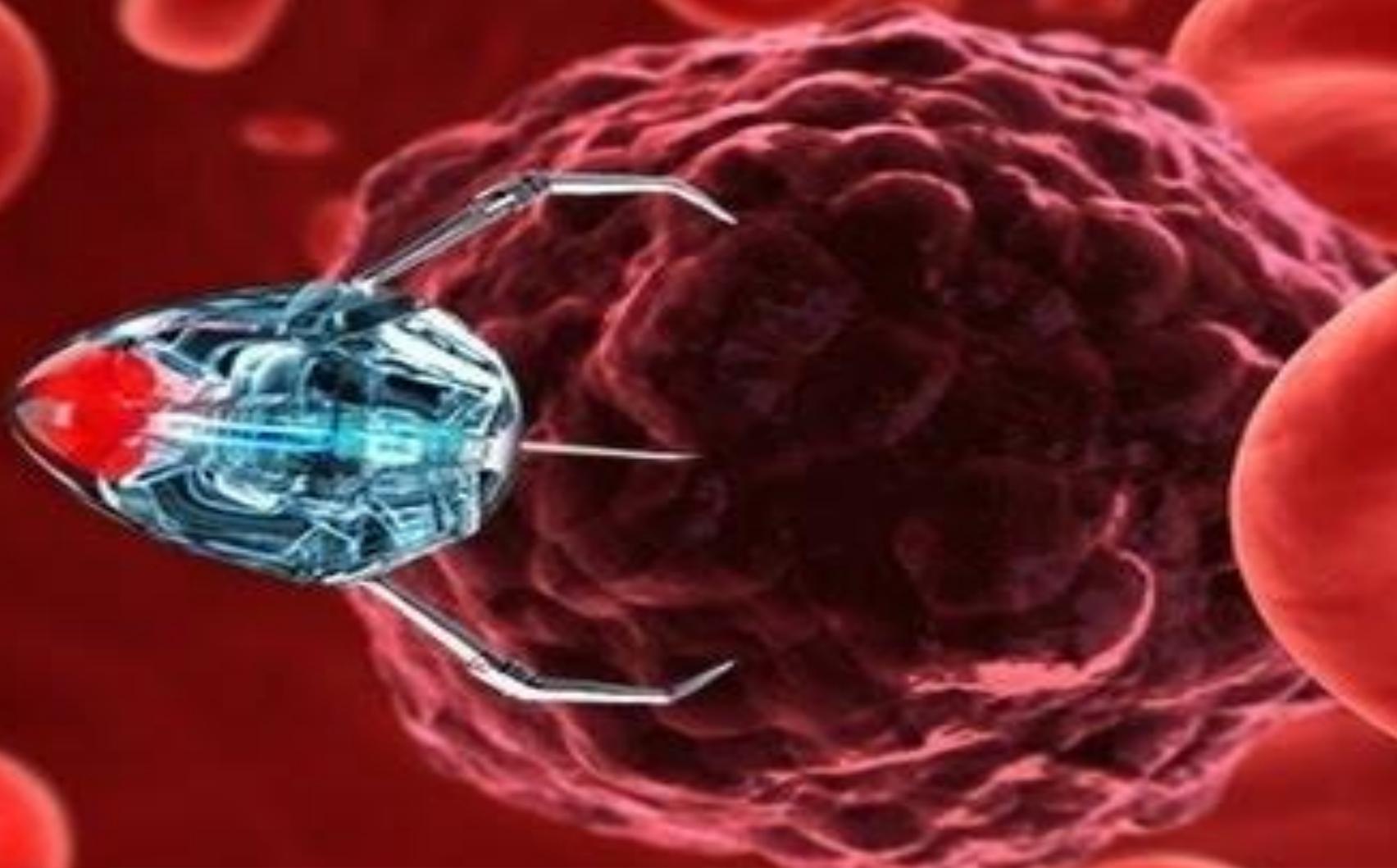
- Fibronectin (FN) and collagen secretion by the fibroblasts seeded



Conclusions

- modification of PCL





thanks for your attention