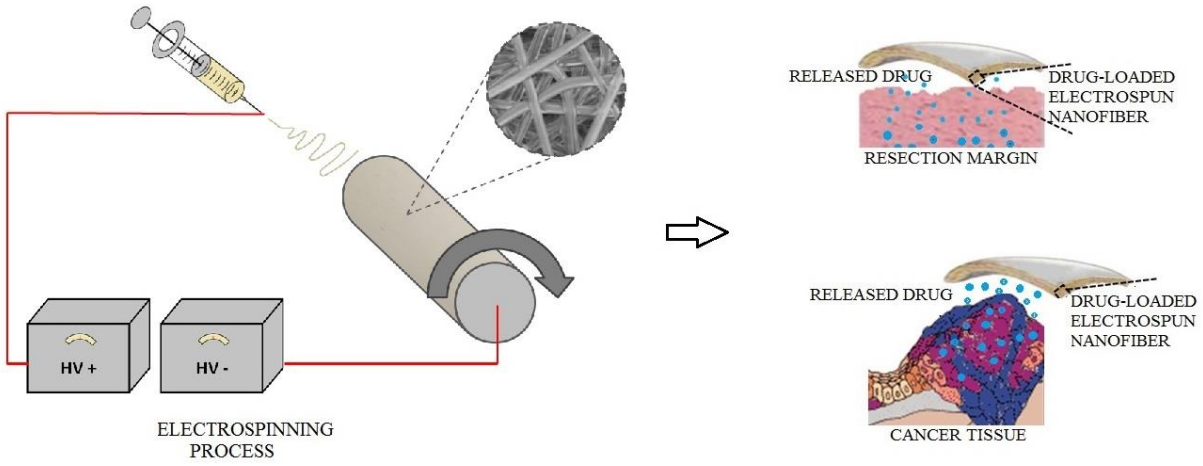
Insufficient drug uptake by solid tumors remains a major problem for systemic chemotherapy. Also, a local recurrence following cancer surgery remains a clinical challenge. Loco-regional drug treatments offer significantly higher drug concentrations in the tumor tissue or resection cavity while minimizing systemic toxicity. To acquire a high drug loading capacity, electrospun nanofiber matrices (patches), called also nonwovens, have been widely explored as promising drug delivery systems. Electrospun drug-loaded nonwovens can influence the effectiveness of the therapy since they provide a high surface area to volume ratio, the controllable pore sizes and the tunable drug release profiles at the desired site of action.

The aim of the project is to develop the nanofibers with novel anticancer agents: betulin or its derivatives for a sustained drug release and with the proper mechanical properties (flexibility) using the innovative technique of electrospinning.



The electrospun drug-loaded implants are intended to be implanted into a tumor resection cavity or directly into the tumor tissue (in case of the inoperable cancers), as postoperative chemotherapy of the cancers reducing the toxicity and side effects compared to the conventional systemic therapy. The project is mostly focused on breast cancer therapy and will contain *in vitro* analysis on cell lines and *in vivo* tests on mouse model of breast cancer. Breast cancer is the most commonly diagnosed cancer type and the leading cause of cancer death in women worldwide. Its hallmarks are uncontrollable growth, immortality, the ability to invade other tissues and inflammation. The residual tumor cells in the surgical margins of the tumor bed increase the risk of cancer recurrence and metastasis. On the other hand, the systemic application of the drug to the solid tumor is dramatically inefficient.

We expect that the developed electrospun nanofiber patches loaded with an anticancer agent may bring some progress in the implantable delivery systems for the cancer treatment: improvement of effectiveness and reduction of toxicity and side effects compared to the conventional systemic therapy.