

## **Nanofiber matrices for local control of pediatric solid tumors after subtotal resection surgery**

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### **Abstract**

Local tumor control in pediatric oncology requires new treatments as an alternative to radiotherapy. SN-38 is an anticancer drug with proved activity against several pediatric solid tumors including neuroblastoma, rhabdomyosarcoma and Ewing sarcoma. Taking advantage of the extremely low aqueous solubility of SN-38, we have developed a novel drug delivery system (DDS) consisting of matrices made of poly(lactic acid) electrospun polymer nanofibers loaded with SN-38 microcrystals for local release in difficult-to-treat pediatric solid tumors. To model the clinical scenario, we conducted extensive preclinical experiments to characterize the biodistribution of the released SN-38 using microdialysis sampling *in vivo*. We observed that the drug achieves high concentrations in the virtual space of the surgical bed and penetrates a maximum distance of 2 mm within the tumor bulk. Subsequently, we developed a model of subtotal tumor resection in clinically relevant pediatric patient-derived xenografts and used such models to provide evidence of the activity of the SN-38 DDS to inhibit tumor regrowth. We propose that this novel DDS could represent a potential future strategy to avoid harmful radiation therapy as a primary tumor control together with surgery.