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Electrohydrodynamic fabrication of core-shell microparticles for controlled-release immunotherapy of ovarian cancer

The low success rates of immune checkpoint-inhibitors (CPIs) in the treatment of ovarian cancer may be attributed to low bioavailability following administration. Local administration of CPIs, *i.e.* intraperitoneal, rather than intravenous, in mouse models can improve therapy by increasing proximity of the treatment to the cancer target. However, injections need to be administered every other day to achieve the desired therapeutic effects. Microencapsulation techniques, such as the electrohydrodynamic atomization (EHDA) or electrospray method, can prove useful in developing controlled-release biomaterials for prolonged bioavailability. We propose a single-administration treatment using microparticles with an immune checkpoint inhibitor core encapsulated within a biodegradable PLGA shell. In the electrospray technique, syringe pumps dispense core and shell material solutions through a coaxial steel needle which receives a high voltage. When the electric charge build-up overcomes the solutions' surface tension, monodisperse particles are deposited onto a grounded collector. Here, we develop and categorize controlled-release microparticles for immunotherapy using EHDA. The preliminary results show scanning electron micrographs of microcapsules with a PEG core and PLGA shell of 1-3 μm.