Project: Development of nanocarriers directed to dodge potential drug resistance mechanisms using a 3D crosstalk model of pancreatic adenocarcinoma cells and its associated stroma.
Short description: Pancreatic cancer (PanCa) is a highly lethal disease, only 5-7% of patients diagnosed survive for five years and, shockingly, is the only cancer that has seen no improvement in survival in 20 years. The most common type of PanCa, pancreatic ductal adenocarcinoma (PDAC), is considered one of the most aggressive carcinomas representing the fourth most common cause of cancer-related death worldwide, despite it represents about 2% of all cancer occurrences. To some extent, the poor therapeutic outcome of PDAC patients have been ascribed to the intrinsic complexity of the tumor, which is protected by a physical barrier, creating a poor vascularized tissue with a hypoxic core microenvironment. This fact intuitively leads to the idea that successful therapies must combine a reduction of this complex stromal barrier to give access to the antitumoral drug. The general hypothesis of the proposal is that the treatment of this tumor requires the use of an efficient drug delivery system (DDS) able to circumvent the stromal barrier to deliver a combination of cytotoxic drugs to overcome drug resistance. Hence, this project aims to the preparation of a DDS based on mesoporous silica nanoparticles for the sequential delivery of combinations of three drugs (small-molecule drugs and RNA) to the tumor and testing these DDSs on realistic 3D culture models as close as possible to the actual tumor. **Technical skills:** experience in organic synthesis and cell culture are
Openings offered: 1 Master thesis
Language: English
Director MS thesis: Dr. David Sánchez and Dr. Carlos Semino
Location: Supramolecular Chemistry Lab. and Tissue Engineering Lab.