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Personalized Cancer Nanomedicine Simo Schwartz Jr MD PhD

It has been hypothesized that drug delivery by nanoparticles may well circumvent the resistance machinery of cancer stem cells (CSC). To be able to study efficacy of nanomedicines in population of CSC, we first developed an *in vitro* model in which CSC are tagged by a fluorescent reporter gene under the control of a CSC specific promoter. Using this system, we demonstrated that while bulk cancer cells die, CSC population augments after paclitaxel (PTX) treatment. We then investigated the prospects of different targeted and non-targeted delivery systems loaded with PTX and functionalized with specific antibodies against cancer stem cell populations in regular breast cancer cell lines, as well as in our CSC models. Our data shows that reducing tumor resistance of cancer stem cells might be related to specific active targeting of DDS and not attributed to a general mechanism of action of nanomedicines.

Dr Simó Schwartz Jr (1967, Barcelona) is the Director and Board member of the CIBBIM-Nanomedicine, which is focused on the research of new biomedical nanotechnology-based applications. In particular, new drug delivery systems, image based diagnostic systems and preclinical validation of therapeutic conjugates and biosensors, mainly in the areas of oncology and rare diseases. He is also member of the Science Advisory Board of the Vall d'Hebron Research Institute (VHIR) and member of the Science Advisory Board of Oryzon Genomics, a Spanish leading biotech company. He holds 12 patents, most transferred to leading companies of the biotech and pharma sectors. He also leads the "drug delivery and targeting group" at the CIBBIM-Nanomedicine. In this context, Dr Schwartz Jr is coordinator and collaborator of several research projects directly related with the obtention and validation of therapeutic drug delivery systems. Among them are international and EU projects involving SME's in which animal models are being used for preclinical validation of new therapies directed against tumor cells. Dr Schwartz Jr is also member of the Nanomedicine Spanish Platform (NanomedSpain) and of the "European Platform for Nanomedicine" where he co-authored the 2006 Research Strategic Agenda intended to the European Commission. His research group is also a group member of the "CIBER de Bioingeniería, Biomateriales y Nanomedicina" (CIBER-BBN) of the Spanish Health Institute Carlos III (ISCIII) which gathers a total of 50 research groups of national excellence in the field of nanotechnology and nanomedicine. Dr Schwartz Jr was the Nanomedicine Coordinator of CIBER-BBN at the national level and has been recently appointed as Deputy Director and technology transfer coordinator. Dr Schwartz Jr is also a Co-founder and Science Advisor of ARGON Pharma SL (2008), a Spin-Off company established at the Barcelona Science Park with the mission to develop new innovative therapies to provide solutions to unmet medical needs in the oncology field, and also to develop new technologies for drug delivery and diagnosis to improve current therapies. Dr Schwartz Jr is also acting as Science Advisor of ORYZON GENOMICS, SOM BIOTECH and CELGENE and member of the Advisory Board of NANOCAN, Southern Denmark University.