

**A personalized, patient-centric, nano-based technology platform for the diagnosis and treatment (theranostic) of cancer system diseases.**

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The technology developed by Cericol is based on a nano carrier system to be employed as a theranostic tool for the treatment of cancer and/or aging-associated neurodegenerative diseases.

The theranostic approach (therapy and diagnosis) takes advantage of the possibility to employ nanostructured materials simultaneously as multifunctional platforms for hyperthermic treatment, controlled drug release and imaging/sensing applications.

The hybrid nano-system envisages an innovative treatment (RF and drug release) of several diseases based on the self-accumulation of the nano-carrier onto the target site of different solid tumors thanks to the specific recognition between antibodies (carried by the nano-carrier) and tumoral markers.

One of the main drawback of the nano-drug delivery is represented by the targeting issue: the accumulation of nanocapsules onto the target tissue is regulated by several factors as their ability of reaching complex and anatomically different tumoral tissues, their ability of recognizing specific moieties expressed by tumoral cells (antigens) and, finally, their ability of escaping the immune system.

To solve the limits encountered by this approach our group has recently developed a robust technique to load hybrid nanoparticles into immune cells still maintaining their viability and functionality unaffected. This method implies the preparation of products based on live-cells with the aim of enhancing their therapeutic, diagnostic or preventive effect.

This technique could allow a custom, patient-centric and precision therapy against severe diseases such as malignant melanoma or, in the neurological field, the multiple sclerosis.

On the other hand many ethical questions are emerging; especially about using nanostructures conjugated with human immune cells and the use of nano-systems especially in chronic therapies like MS.

Another aspect that must be considered are the issues related to the collection of sensitive data and the use of health status information, present and future of the patient.