

[Prof. Ruggero De Maria](#), Ordinario di Patologia Generale, Università Cattolica del S. Cuore

“Le cellule staminali tumorali dalla biologia alla clinica”

□ "cancer stem cells: from bench to bedside"

In recent years, the body of knowledge supporting the pivotal role of Cancer Stem Cells (CSCs) in tumor initiation, maintenance and spreading has grown notably. These cells are largely resistant to conventional therapies, which target preferentially their differentiated non-tumorigenic offspring.

We have isolated and expanded *in vitro* CSCs from several solid tumors, including glioblastoma, prostate, breast, lung, colon, thyroid, and renal cancer. Orthotopic injection of these tumorigenic cells in immunocompromised mice recapitulates the behaviour of human cancer and may provide reliable preclinical models mimicking the original tumours.

The use of genomic and proteomic platforms allowed to get a comprehensive picture on actionable mutations and protein signaling involved in cell survival and drug response. This approach combined with the screening of libraries of drugs and molecules together with the generation of CSC-specific monoclonal antibodies has allowed us to design multiple strategies for effective targeting of CSCs. Moreover, the definition of the tumorigenic populations with higher migratory activity allowed us to identify the CSCs responsible for producing metastasis in colorectal cancer and the key effect of microenvironment in stemness maintenance and metastatic potential.

Thus, although the identification of CSCs is relatively recent, this research area appears extremely promising and may significantly contribute to the understanding of cancer biology and the rational design of novel targeted therapies for cancer.

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