## **EUROPEAN RADIATION RESEARCH 2012**



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## **CANCER STEM CELLS**

Friday, 19 October 2012 09:00 (1 hour)

Cancer stem cells (CSCs) are a subset of tumor cells that are thought to be responsible for tumor initiation, maintenance and spreading. These cells are largely resistant to conventional therapies, which target preferentially their differentiated non-tumorigenic progeny.

We developed a technology that allowed us to isolate and expand in vitro CSCs from several solid tumors, including glioblastoma, prostate, breast, lung, colon, thyroid and ovary cancer. Orthotopic injection of these tumorigenic cells in immunocompromised mice recapitulate the behaviour of human cancer and provide reliable preclinical models that can reproduce unlimited times the tumors of single patients.

The use of a medium-throughput platform that quantifies relevant proteins and post-translational modifications of signaling proteins involved in cell survival, coupled with a functional screening of pathway inhibitors, allowed us to map the pathways active in CSCs to be targeted for effective therapies. By unsupervised clustering analysis, we were able to identify different subclasses of tumors that respond differently to targeted therapy and radiation. Notably, in vitro testing of therapeutic compounds was able to predict the in vivo sensitivity in preclinical models. More importantly, the first clinical data showing a possible predictive value of in vitro CSC analysis are emerging in metastatic patients that failed multiple line of treatment.

Thus, although the identification of CSCs is relatively recent, this research area appears extremely promising as it is likely that CSC targeting may significantly contribute to the rational design of novel targeted therapies for cancer.

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