allied academies

11th International Conference on
CANCER STEM CELLS AND ONCOLOGY RESEARCH

June 11-13, 2018 | Dublin, Ireland

METAKARYOTIC CANCER STEM CELLS ARE CONSTITUTIVELY RESISTANT TO X-RAYS AND CHEMOTHERAPEUTIC AGENTS BUT SENSITIVE TO MANY COMMON DRUGS: FIRST CLINICAL TRIAL SHOWS EFFECTIVENESS OF A METAKARYOCIDE AGAINST STEM CELLS IN HUMAN PANCREATIC TUMORS

William G Thilly and **Elena V Gostjeva**
Massachusetts Institute of Technology, USA

After radio- and chemo-therapy human tumors display many dead eukaryotic cells with pyknotic nuclei. But amitotic metakaryotic stem cells with hollow, bell shaped nuclei are unaffected as expected of treatment-resistant cancer stem cells. These same phenomena may be observed *in vitro* using any of many tumor or metastasis-derived cell lines the immortality of which is conferred by the presence of amitotic, metakaryotic cancer stem cells. About 5% of human colonic adenocarcinoma-derived HT-29 cells in exponential growth are immortal metakaryotic stem cells that increase by symmetric amitoses and continuously create mortal mitotic eukaryotic cells by asymmetric amitoses. Two assays for agents/conditions specifically toxic to metakaryotic stem cells have been devised: (a) microscopic recognition of necrotic metakaryotic nuclei and (b) survival of cells forming large immortal colonies visibly containing metakaryotic stem cells *in vitro*. X-rays and chemotherapeutic agents (alkylating agents, antimetabolites and mitocides) have been found to kill eukaryotic cells but not metakaryotic cells at doses commonly used in cancer therapy. In contradistinction, we have shown that multiple classes of common drugs are preferentially cytotoxic to metakaryotic stem cells including NSAIDS, antibiotics and drugs used to treat diabetes, hypertension and other medical conditions. There are reports of the first images demonstrating killing of the preponderance of metakaryotic cancer stem cells in a series of pancreatic tumors by an antibiotic metakaryocide in a clinical trial in progress at the Medical College of Wisconsin (Prof. Susan Tsai, M.D, Principle Investigator). Research plans to identify effective protocols for a series of metakaryocidal drugs are outlined.

BIOGRAPHY

William G Thilly, Sc.D. was born in Port Richmond NY, USA and is now Professor of Genetics, Toxicology and Biological Engineering at MIT. With multiple collaborators he and Dr Gostjeva are exploring the bizarre physiology of metakaryotic stem cells, growing them in cell cultures, and devising means to kill them with drugs and protocols expected to be well tolerated in patients.

thilly@mit.edu