

29th Euro-Global Summit on

Cancer Therapy & Radiation Oncology

July 23-25, 2018 | Rome, Italy



Christopher S Lange

Downstate Medical Center, Brooklyn, NY, USA

Applying Koch's postulates to test the cancer stem cell basis of cancer

We tested the cancer stem cell (CSC) hypothesis using the patented Hybrid Spheroid (HS) Assay (HSA) and by applying Koch's postulates to test its validity. The HSA is an *in vitro* assay that enables one to take a viable sample of an individual patient's tumor, make a single cell suspension, mix it in known proportions with human fibroblasts (AG1522) and dispense a known number of cells of the mixture into each well of ultra low attachment (ULA) 96-well plates to agglomerate into 1 HS/well, each containing an average of <1 CSC. The HS provides an analog of the CSC niche, enabling the CSC to proliferate (with some daughters differentiating into amplifying transit cells (ATCs)) and undergo 10–15 symmetric divisions before exhausting the nutrients. This satisfies the McCulloch and Till (spleen colony assay) requirements for a stem cell. Applying Koch's postulates, we answer the following questions: Does the patient's tumor contain cells with CSC properties?; Can we isolate and propagate these cells?; Can these cells induce the tumor *in vivo*?; Do these cells contain and express specific gene products that give them CSC properties?; If we disrupt these genes, do the cells lose their CSC properties?; If we eliminate the CSCs do we eliminate the cancer? The HSA was applied to tumor samples taken from individual endometrial adenocarcinoma patients and correctly predicted, based on CSC radioresistance, in patients who fail their standard-of-care treatments. It was therefore concluded that the CSC hypothesis is validated in the HSA.

Biography

Christopher S Lange is the Associate Chair, Department of Radiation Oncology, SUNY Downstate Medical Center, Brooklyn (2010–Present), Professor of Molecular and Cell Biology, School of Graduate Studies, SUNY Downstate Medical Center (1992–Present), Professor, Director, Radiobiological Division, Department of Radiation Oncology, SUNY Downstate Medical Center (1980–Present), Associate Director, Residency Program, SUNY Downstate Medical Center (2009), Assistant Professor of Radiology, Radiation Biology and Biophysics, University of Rochester School of Medicine and Dentistry, New York (1969–1980), NHS Senior Research Officer, Christie Hospital and Holt Radium Institute, Manchester, England (1968–1969), NHS Research Officer, Christie Hospital and Holt Radium Institute, Manchester, England (1962–1968), MRC Research Assistant, Radiobiology Laboratory, Churchill Hospital, Headington, England (1961–1962).

Christopher.Lange@downstate.edu