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Genetic determinants of breast cancer stem cells defined in mice

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Breast cancer stem cells (BCSCs) constitute a subpopulation of tumor cells that express stem cell associated markers and have a high capacity for tumor generation in vivo. Identification of BCSCs from tumor samples or breast cancer cell lines has been based mainly on CD44+/CD24−/low or ALDH+ phenotypes. BCSCs isolation has allowed the analysis of the molecular mechanisms involved in their origin, self-renewal, differentiation into tumor cells, resistance to radiation therapy and chemotherapy, and invasiveness and metastatic ability. Molecular genetic analysis using knockout animals and inducible transgenics has identified NF-[1]B, c-Jun, p21CIP1, and Forkhead-like-protein Dach1 involvement in BCSC expansion and fate. Clinical analyses of BCSCs in breast tumors have found a correlation between the proportion of BCSCs and poor prognosis. Therefore, new therapies that specifically target BCSCs are an urgent need. We summarize recent evidence that partially explain the biological characteristics of BCSCs

Biography

Richard G. Pestell, MB, BS, MD, PhD, MD (Hon. Causa), FACP, FRACP, MBA, *Director, Kimmel Cancer Center, Vice President, Oncology Services, Associate Dean, Cancer Programs, Chairman, Department of Cancer Biology*. Dr. Pestell received his MD (MBBS) from the University of Western Australia and his PhD degree from the University of Melbourne. He undertook post doctoral and clinical training in Hematology/Oncology and Endocrinology. As the single Australian recipient of the Royal Australian College of Physicians' Winthrop traveling scholar and Neil Hamilton Fairley Scholar (1991-1994), he continued research at Harvard University and served as clinical fellow at Massachusetts General Hospital. Prior to his current position at the Kimmel Cancer Center, Dr. Pestell was Director of the Lombardi Cancer Center, Associate Vice President of the Medical Center at Georgetown University and Board member of the Georgetown University Hospital in Washington, DC.

Dr. Pestell has authored 388 original publications and book chapters and 187 published abstracts. His work is highly cited (~27,500 citations, H-index:88). His papers have been published in prominent peer reviewed journals including Cell, Science, Nature Medicine, Molecular Cell and EMBO J. In March 2002, he was ranked first in the world for increase in total scientific impact in biology and first in the world for biochemistry (ISI). Dr. Pestell is funded as the Principal Investigator of six RO1 grants and Principal Investigator of the Kimmel Cancer Center CCSG grant.

Dr. Pestell has received a number of awards for his scientific discoveries in breast and prostate cancer, including the Harrison Award (highest award of the Australian Endocrine Society), Fellow of the Royal Society of Medicine (UK), Doctor HonorisCausa, (University of Western Australia), elected membership to the American Society of Clinical Investigators, the Irma T. Hirschl Weil Caulier Career Scientist Award, Diane Belfer Faculty Scholar in Cancer Research, the Pfeiffer Award, and elected fellow to the American Association for the Advancement of Science. Dr. Pestell serves as a reviewer for 11 funding agencies and has been an active member of NIH study sections (RO1, SPORES, Cancer Centers, Program projects). Dr. Pestell has been a reviewer for 25 distinct scientific journals (currently an active editorial board member of seven journals) and has served on the external advisory board of six NCI-designated cancer centers

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