

QUINCY COLLEGE



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Researching the Production of Cancer Stem Cells Quincy College Adjunct Instructor Published in Anticancer Research: International Journal of Cancer Research and Treatment

SOCIAL MEDIA RELEASE (280 Characters): Researching the production of cancer cells, @QuincyCollege Adjunct Faculty Dr. Sibaji Sarkar PhD, hypothesizes on the role of the epigenetic switch in an article published in #AntiCancerResearchJournal.

Press Release Summary: Quincy College Biotechnology Adjunct Instructor, Dr. Sibaji Sarkar, PhD. has published an article entitled, "[Cancer Progenitor Cells: The Result of An Epigenetic Event?](#)" in the January 2018 issue of the journal Anticancer Research: International Journal of Cancer Research and Treatment as a corresponding author. The article describes how alterations in the *epigenetic switch*, defined as the process for how genes are switched on and off, could potentially generate cancer progenitor cells, which are biological cells similar to but more specific than stem cells. The authors explore the role epigenetics play in the regulation of and the formation of cancer progenitor cells, cancer progression, metastasis, and relapse by alteration of the *epigenetic switch*.



Quincy College adjunct instructor, Dr. Sibaji Sarkar, Ph.D., corresponding author.

(Photo Credit: Dr. Sibaji Sarkar)

Quincy, MA and Plymouth, MA (1/23/2018):

The concept of cancer stem cells was proposed in the late 1990s. Although initially the idea seemed controversial, the existence of cancer stem cells is now well established. However, the process leading to the formation of cancer stem cells is still not clear and thus requires further research. Quincy College Adjunct Instructor Dr. Sibaji Sarkar, Quincy College student Sandra McGonagle, and co-authors have published their research "[Cancer Progenitor Cells: The Result of An Epigenetic Event?](#)" in the latest issue (January 2018) of Anticancer Research: International Journal of Cancer Research and Treatment. Article co-author Ms. McGonagle attended Quincy College studying Biochemistry with Dr. Sarkar.

The article hypothesizes epigenetic events and more specifically the epigenetic switch can possibly produce cancer progenitor cells from predisposed cells by the influence of their environment.

Carcinogenesis or the development of cancer in seemingly healthy cells appears to be an extremely complex process. It is an uncontrolled division of cells, which are essentially immortal. Specifically, tumors include development of mechanisms that permit some cells to travel to

distant tissues, attach to them, and grow there, which is called metastasis. Surprisingly, similar tumors can possess diverse and many types of mutations.

When the genome analysis project was completed, researchers believed that we finally knew all about genes and how they work. However, it is clear now, that the genome is comparable to hardware of a computer and it needs software to run, known as epigenetics. Epigenetics are reversible modifications of DNA and histone proteins (around which DNA are wrapped) that turn on or off gene activity. The authors postulated that a particular combination of these modifications in a cell comprise an epigenetic switch.

Wide and random variety of genetic alterations including mutations in genes, occur within similar types of tumors in different patients. As stated by some researchers these processes appear to be in complete chaos, though the pathways that are activated or silenced, and possibly play a role, have been worked out extensively in last 35 years. It is surprising why cancer develops in one type of cells and tissues, and not in others, even when mutations occur randomly in any type of tissue and inherited mutations are present in all tissues. Predisposition already present in these cells, such as mutations and other genetic alterations inherited or acquired decide the rapid development of these cancer progenitor cells to full-fledged cancer.

"These modifications of DNA and histones are fixed for particular tissue cells, which is a signature and could be called an epigenetic switch. The alteration of this switch in a few predisposed cells of a particular tissue, tilt the balance towards immortality by forming cancer progenitor cells," corresponding author Dr. Sibaji Sarkar stated.

Dr. Sarkar added, "The reason why most cancers relapse even after apparent remission is that the drug resistant cancer cells and cancer progenitor cells are not killed by standard therapies."

The authors proposed before to utilize epigenetic drugs in combination with standard therapies, including target-specific chemotherapy and immunotherapy, to reduce cancer relapse.

Karolina Lapinska, M.S. is the first author of the paper. Other co-authors include, Gabriela Faria, Sandra McGonagle, Kate Morgan Macumber, and Sarah Heerboth.

Dr. Sibaji Sarkar received his Ph.D. in Biochemistry from Jadavpur University, Kolkata. He was a research associate at University of Chicago, University of North Carolina at Chapel Hill and at Dana Farber Cancer Institute/ Harvard Medical School, Boston and then he was a faculty at Boston University School of Medicine, Boston. He is an adjunct faculty at Quincy College, Quincy, MA; MassBay Community College, Wellesley, MA and Roxbury Community College, Boston, MA.

His current research showed how DNA methylation process is regulated in cancer cells for differential gene expression. He further showed that the combination of epigenetic drugs with other drugs may be a better choice for cancer therapy to reduce relapse. He hypothesized how epigenetics regulate the formation of cancer progenitor cells, cancer progression, metastasis and relapse by alteration of epigenetic switch. His previous work showed how integrins work with syk kinase to form thrombus by platelets, which causes myocardial infraction (heart attack). He has a patent on development of anti-thrombotic agents. He edited the volume of Methods in Molecular Biology on HDACs. He edits special issues on epigenetics and cancer and he is reviewer of many scientific journals.

For more information on Quincy College faculty publications, research, and accomplishments, visit: quincycollege.edu/facultyfocus.

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ABOUT QUINCY COLLEGE

Founded in 1958, Quincy College is a two-year, municipally affiliated community college serving approximately 4,500 students at campuses located in Quincy and Plymouth, Massachusetts. Quincy College is an open access institution that encourages academic achievement and excellence, diversity, economic opportunity, community involvement, and lifelong learning. The College facilitates valuable learning relationships that inspire students to realize their educational and professional futures. The college offers 37 associate degree programs and 25 certificate programs in a variety of disciplines, including those within Professional Programs, Liberal Arts, Natural & Health Sciences and Nursing. The college is accredited by the New England Association of Schools and Colleges, and is licensed by the Massachusetts Board of Higher Education to grant the degrees of Associate in Arts and Associate in Science.

As "The College of the South Shore", Quincy College draws a diversity of students from the greater metro Boston area, South Shore, Cape and the Islands, as well as 121 countries around the world. For additional information, visit www.quincycollege.edu