"The Growth of Cancer Stem Cells" (A look at new cancer research fields led by the NISER Institute)

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In cancer, progenitor cells, former embryonic stem cells, generate tumor cells; while, in cancers, stem cells, once with previous information, differentiate into cell types. These two phenomena characterize the state of diseases which have been extensively investigated in cellular and molecular biology and science. In this paper we describe two new phenomena of progenitor cells, peroxisome proliferator activated receptors, or PAPs, and limiter signaling molecules, or TMRs, which we believe are functioning in a complex pathway involving molecular communication and since they clearly influence the creation of cancer. We investigated these two phenomena with the help of a sophisticated camera system, a photomaging microscope.

In collaboration with Koen Stavenhagen, Deputy Professor of Genetics, and Jens Walpole, Karlsruhe Institute of Technology, we carried out a novel research on tumour cells in the laboratory of Prof. Jakob Dâ€™Agostino. We used the proprietary method of imaging tumor cells using the computed tomography (CT) scanner developed at IGIT for a significant step in the understanding of cancer and the origin of tumours. Using a powerful camera technology to image tumour cells on a secure 3D digital surface, we analysed cellular transcriptional functions and activated TMRs to directly analyse the existence of PAPs and TMRs. Using the camera images and electron microscopy, we investigated the effect of tumour in vitro on the in vitro activation of TMRs. We first show that the tumour induces the cellular interaction between PAPs and TMRs as well as determines the expression of TMRs. Cancerisation also results in a rapid expansion of tumour cells which make TMRs react very heavily against PAPs and suppress PAP expression. Similarly, tumour cells elicit in vitro growth, maturity and proliferation. They also spread to neighbouring cells. This means that both PAPs and TMRs are chronically activated by cancer formation, and tumors constitute a dynamic control mechanism that overcomes the dependence of PAPs and TMRs on the adaptive regulation of TMRs. Our work provides an important foundation for the development of new therapies that restore these two signal molecules in cancer cells.

About NISER

NISER, the National Institute for Environmental Health Research, German Federal Ministry of Education and Research, is Germanyâ€™s premier national institution for environmental and occupational health sciences. The Institute employs nearly 4000 employees and supports industry and academic research in a wide range of natural and man-made products and processes.

The Institute consists of about 50 separate research groups. Over 3,600 scientists, technicians and administrative staff conduct research activities on animal, human, plant, microbe and viral tissues. In recent years, NISER has established a strong chemical component, mainly through the integration of the residue quality research group. This innovative innovation model is successfully driven and supported by German chemical companies and environmental and operational companies. By developing the Institute, German governments are at the forefront of driving environmental research.

It is part of the expertise in human exposure to environmental contaminants. Thus, the Institute works on the fundamental issues of biomolecular sciences, therapeutics, pollutants, toxicological and risk management. This understanding has attracted both private industry and governmental funding, at high risk levels for long periods of time, in periods of shortage of research funds and of unacceptably high cost.

A Black And White Cat Sitting In A Tree