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Beyond immortality: Understanding cancer stem cells

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The cancer stem cells (CSC) are tumorigenic cells which phenotypically and functionally resemble stem cells and which are responsible for failures in conventional therapies and relapses. Consequently, genesis of cancer depends on the type of progenitor stem cells affected in stem cell hierarchy and the varying degree of stemness. The ability of CSC to possess the intrinsic stem like property enables them to produce more CSCs, ultimately bearing a tumorigenesis. They possess numerous biological properties covering hypoxia, unstable phenotype, multipotency and vigorous self-renewal leading to leukemogenesis. They express unique surface markers based on the type of cancer and are endowed with tumorigenic capacity sustaining growth. The epigenetic or genetic alteration giving rise to falsifications in normal cell signaling pathways such as Wnt/β-catenin, Notch, Hedgehog, etc. may also result in cancer cells behaving like stem cells. Promising therapeutic strategies hostile to CSCs involve steering the self-renewal pathways of CSCs, disrupting the communication between CSCs and their microenvironment. Stem cell niche becomes vulnerable to a plethora of carcinogenic mutations, injuries or insult. Importantly, the oncogenic transformation of these cells is highly potent. The classical example of CSC is blast crisis in chronic myeloid leukemia, where with the current available treatment, only the burden of blast cells can be kept in control till the chemotherapy works. However, there is no treatment to attack the blast producing CSCs, owing to their extremely malignant potential and drug-resistant properties. CSCs signify and strengthen objectives of the essence for evolving innovative anticancer drugs and therapeutic stratagems.

Biography

Pooja Vinayak Shahapurkar is working as Clinical Research Fellow in the Department of Medical Oncology and Stem Cell Transplant at Jaslok Hospital and Research Centre Mumbai, India. She is a Post-graduate from Cranfield University, UK and has gained basic laboratory work experience in Biochemistry, Immunology, Haematology and Microbiology lab. She is conversant with concepts of hematopoietic stem cell mobilisation, harvest, storage and transplant. She has to her credit few scientific write-ups published for international conferences along with chapters and is familiar with essentials of scientific publications and presently part of s research project entitled, "Isolation of T regulatory cells in heterogeneous population".

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