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Deconstructing Cancer Progression: Cancer Stem Cells and Dedifferentiation

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In the last decades cancer has evolved as the most common human disease with lung cancer toping the ranking. All over the world different theories have tried to explain the emergence, development and progression of human tumors, although none have yet fully succeeded on its task. One of the recent and most appealing theories argues that the heterogeneous nature of each tumor encompasses a specific population of cells, with Stem Cells (SCs) like properties, which gives rise to the bulk of the tumor cells with more differentiated phenotypes**1**. Although, these Cancer Stem Cells (CSCs) have been blamed as responsible for tumor recurrence and resistance to conventional therapies**2**, their origin is rather controversial.

Aiming to understand the mechanisms underlying hexavalent chromium [Cr(VI)] induced lung cancer, we succeeded to induce the malignant transformation of the non-tumorigenic bronchial epithelial cell line (BEAS-2B) following exposure to occupational relevant Cr(VI) concentrations**3**. Subsequently, the resulting RenG2 cell line malignant potential was increased following successive rounds of transplantations in athymic nude mice**4**. Metabolic and cell cycle studies revealed that the more malignant RenG2-derivative cell lines (DRenG2 and DDRenG2) have increased glycolytic metabolism and decreased replicative index. Additionally, sphere-formation assays also revealed positive only for DRenG2 and DDRenG2 cell lines and the molecular characterization of those cultures confirmed their CSCs-identity.

Apparently, the increased malignant potential of DRenG2 and DDRenG2 cell lines can be ascribed to a process of cellular dedifferentiation leading to the emergence of CSC-like sub-populations in both cell lines boosting their aggressiveness and resistance.

Biography

Carlos Rodrigues, has 25 years old and is a last year PhD student at the University of Coimbra, Portugal. He has finished his graduation in Biology at the same University in 2008. Since the last year of his graduation he has been focusing his research in trying to highlight the molecular mechanisms underlying hexavalent chromium induced lung cancers and its progression to metastasis. So far he has already published 7 papers (2 original research paper, 1 review and 4 proceedings) and has 2 additional manuscripts under revision.