Cancer stem cell markers in lung cancer: Proofs of concept and some reservations

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Lung cancer ranks as the most common form of cancer-related deaths worldwide. Despite advances in the treatment modalities to match a personalized therapy, prognosis remains poor because of disease recurrence after therapy. A strong consensus posits that cancer stem cells (CSCs) are mainly responsible for the failure of therapeutic agents to completely eliminate cancer. CSCs are proposed to be rare cells within a malignant tumor capable of cancer progression and are chemoresistant. Hence, the identification of CSC-associated genes, cell surface antigens and signaling pathways associated with a defined lung tumor may reveal their distinct roles in the initiation and progression of the neoplasm, and prognosis after chemotherapy. Our projects have shown remarkable impact on the involvement of putative CSCs in the development, prognosis and drug resistance in lung cancers using CSC cell surface antigen CD44, ALDH intracellular activity and CSC-associated genes: ALDH, CD133, OCT4A, OCT4B, BMI-1, uPAR and ABCG2 in resected normal and tumor lung biopsies, lung cancer cells lines and lung biopsy derived-primary cell cultures. In malignant pleural mesothelioma cell lines, gene expression analysis of cisplatin or premetrexed-resistant cells revealed significantly increased expressions of BMI-1, uPAR and ABCG2 demonstrating their participation in conveying drug tolerance. In another study, cisplatin-tolerant cells within the ALDH-enriched fractions showed significantly increased mRNA expressions of ALDH and CD44 indicating their involvement in conferring drug resistance. Gene expression analysis of the above-mentioned CSC-related genes in paired normal and lung adenocarcinoma biopsies identified early and progressive changes in cancer development and poor disease-free interval after therapy. Specific targeting of CSC markers in combination with the standard therapy may offer a better therapeutic approach and improve patient survival. Although CSC markers have gained positive resonance in the improvement of cancer therapy, recent observations, however, have reported inconsistencies and non-specificity of CSC markers.

Biography
Lourdes Cortes-Dericks completed her PhD in Biological Sciences from the University of Hamburg, Germany focusing on the cellular and molecular mechanisms of desensitization processes in guanylyl cyclase receptors. She now specializes in tumor biology, in particular, the identification and elimination of cancer stem cell subpopulation in lung cancer. She is now a freelance clinical research consultant.

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