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Cancer stem cells: regulation programs, immunological properties and immunotherapy

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ABSTRACT

It is becoming increasingly clear that virtually all types of human cancers harbor a small population of stem-like cancer cells (i.e., cancer stem cells, CSCs). These CSCs preexist in primary tumors, can self-renew and are more tolerant of standard treatments, such as antimitotic and molecularly targeted agents, most of which preferentially eliminate differentiated and proliferating cancer cells. CSCs are therefore postulated as the root of therapy resistance, relapse and metastasis. Aside from surgery, radiation, and chemotherapy, immunotherapy is now established as the fourth pillar in the therapeutic armamentarium for patients with cancer, especially late-stage and advanced cancers. A better understanding of CSC immunological properties should lead to development of novel immunologic approaches targeting CSCs, which, in turn, may help prevent tumor recurrence and eliminate residual diseases. Here, with a focus on CSCs in solid tumors, we review CSC regulation programs and recent transcriptomics-based immunological profiling data specific to CSCs. By highlighting CSC antigens that could potentially be immunogenic, we further discuss how CSCs can be targeted immunologically.

KEY WORDS (limit to 5)
Cancer stem cells, Immunogenicity, Immunotherapy, Prostate cancer stem cells, Stem cell genomics