

عنوان مقاله:

Dissecting IL-2 Signaling Pathway in Non-Small-Cell Lung Cancer Stem Cells

محل انتشار:

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خلاصه مقاله:

Background and Aim: Lung cancer is one of the most common cancers worldwide. Cancer stem cells (CSC) are known to initiate lung cancer. CSC are capable to differentiate into many cells and driving tumor growth by attenuating immune surveillance through secretion or expression of immune-suppressive factors or by the recruitment of accessory cells that locally suppress the immune response. Therefore, recognizing the signaling pathways by which CSC manipulates the immune system to escape recognition is of utmost importance. Methods: Cancer stem cells were isolated from normal lung epithelial cells and lung cancer cell lines (A549 and NCI-H 2170, respectively). Using Affymetrix microarray, the transcriptome of the normal and cancerous stem cells was compared in GEO2R software and the results were analyzed in Reactome software. Eventually, signaling pathways ending in IL-2 in stem cells were evaluated. Results: To activate interleukin 2 cancer stem cells, beta-interleukin 2 receptor binds to JAK1 and IL-2R α binds to JAK3. The IL-2 α receptor is attached to IL-2 and these two are linked to IL-2 beta receptor and the IL-2 beta receptor binds to the gamma subunit of the IL-2 alpha receptor. The complex JAK1 and JAK3 phosphorylate IL2R α and JAK1, Y392, Y338, Y510 phosphorylate IL-2 beta receptor. Y338 phosphorylation of Interleukin-2 beta receptor enables SHC and Y392, Y338, or Y510 phosphorylation of interleukin-2 beta receptor enables STAT. SH1 attached to the interleukin 2 and STAT5 receptors are phosphorylated. Phosphorylated STAT5 dimerizes and goes to the nucleus. SYK is bound to Interleukin 2 beta receptor and is a substrate for JAK1. PTK2B is connected to JAK3 and is phosphorylated. Conclusion: CSC can affect other cells through signaling pathways leading to the production of interleukins. This effect can be one of the escaping mechanisms from the immune system. Currently, Interleukin 2 is used to treat cancers, but the same interleukin can also convert adult T cell into Treg cells. Therefore, recognizing the signaling pathway leading to the production of interleukin 2 in cancer stem cells can provide a precise vision for new therapeutic processes.

کلمات کلیدی:

Cancer stem cell; Interleukin 2; Signaling; Immune system

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