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Identification of side population cells (stem-like cell population) in pediatric solid tumor cell lines[☆]

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Abstract

Purpose

Recent evidence has supported the *cancer stem cell theory* that cancer contains a small number of cancer stem cells (CSC) as a reservoir of cancer cells. Only the CSC, but not most of the remaining constituent cancer cells, are thought to be responsible for tumorigenesis, progression, and metastasis as well as cancer relapse, suggesting that the CSC should be targeted to eradicate the cancer. Side population (SP) cells isolated by fluorescence-activated cell sorting (FACS) using Hoechst dye are known to be enriched in stem cells in various normal tissues as well as cancers. The authors investigated whether such stem-like SP cells may exist in pediatric solid tumors (PSTs).

Materials and Methods

Sixteen pediatric tumor cell lines including 7 neuroblastomas, 4 rhabdomyosarcomas, and 5 Ewing's sarcomas were used for FACS analysis. Analysis of SP cells based on the exclusion of the DNA binding dye, Hoechst 33342, with and without verapamil using FACS was performed.

Results

One Ewing's sarcoma cell line did not show an SP fraction, and only a small fraction of SP cells (0.12%–14.6%) was detected in the other 15 cell lines. These SP cells were all sensitive to verapamil.

Conclusions

This study suggested that most PSTs would contain a small fraction of SP cells (possible stem-like population). Targeting the CSC will provide a novel treatment strategy to eradicate refractory PSTs.

Cancer stem cell; Side population; Neuroblastoma; Rhabdomyosarcoma; Ewing's sarcoma

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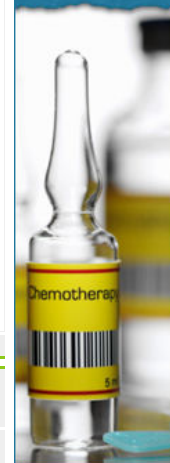
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