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**「Anti-tumor effect of biologics—Recommendation of integrated medicine causing no adverse drug reactions」**

生物製剤による抗腫瘍効果—副作用のない統合医療の勧め

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**【目的】**

われわれは副作用のない治療法、治療薬の開発をめざす統合医学の推進をかけた。治療薬として有効成分が明らかな抽出物を考えている。具体的には担子菌製剤PSK、生薬セファランチン(CR)、樹木茶抽出物タヒボで、有効成分がそれぞれ蛋白結合多糖体、アルカロイド、ナフトキノンとわかっている。

**【方法】**

Invasion Chamberにより浸潤能を測定した。FITC標識Annexin Vでアポトーシスを検出した。血管内皮HUVEC、HMVEC細胞を使い増殖抑制作用を調べた。

**【結果】**

3生物製剤は人工転移モデル“二重移植腫瘍系”で免疫反応を活性化して原発腫瘍のみならず、転移腫瘍の増殖を抑制した。腫瘍細胞に直接働いて転移を抑制するか浸潤抑制について調べた。PSK,CR,タヒボが全てRL-1, Colon 26腫瘍細胞に対する浸潤を抑制した。Daudi, Raji細胞に対するアポトーシス誘導能を調べたところ、CRは両細胞と末梢リンパ球に対して誘導し、タヒボは両細胞に対し誘導し、PSKはDaudi細胞にだけ誘導した。タヒボは血管内皮HUVEC、HMVEC両細胞に対し抑制作用を示し、CRはHUVECに抑制作用を示し、PSKは抑制作用を示さなかった。以上3生物製剤は免疫増強作用は同じでも、腫瘍細胞への直接作用と血管新生抑制作用では異なった反応を示した。

"TAHEEBO," and their active ingredients are a protein-bound polysaccharide, alkaloid and naphthoquinone, respectively.

**[Methods]**

Cell invasion was measured in an invasion chamber. Apoptosis was detected using FITC-labeled Annexin V. The growth inhibitory action was investigated using human umbilical vein endothelial cells (HUVEC) and human pulmonary microvascular endothelial cells (HMVEC).

**[Results]**

The three biologics inhibited not only the primary tumor, but also the growth of metastatic tumors, through the activation of the immunoreaction in an artificial metastasis model, the "double grafted tumor system." We investigated whether the inhibition of metastasis would occur by their direct action on the tumor cells. All of PSK, CR and TAHEEBO inhibited the invasion of RL male 1 and Colon 26 tumor cells. When the induction of apoptosis in Daudi and Raji cells was investigated, CR induced apoptosis in both cells and peripheral lymphocytes, that TAHEEBO induced it in both cells, and that PSK induced it only in Daudi cells. TAHEEBO exhibited its inhibitory action in both HUVEC and HMVEC, CR had its inhibitory action in HUVEC, and PSK showed no such inhibitory action. Thus, these three biological agents have different direct actions on tumor cells and different inhibitory actions on angiogenesis, although their immunity enhancement effect is the same.

**■English translation**

**[Objective]**

In our pursuit of integrative medicine, we aimed at the development of therapeutic methods and drugs that cause no adverse drug reactions. Candidates of such therapeutic drugs are extracts with identified active ingredients. Specifically, these drugs are a product from basidiomycete "PSK," a herbal medicine "cepharanthin (CR)" and a bark tea extract