

III. Products Application

1. Sharko®

A. Sharko® as Complementary Therapy in Cancer

Cancer is a dangerous disease which is characterized by an abnormal and uncontrolled cell growth that is able to spread (to metastasize) to many organs. Due to its characteristics, cancer often results in death. Another term for cancer is “malignant tumor”. There are two types of tumor: benign (non-cancerous tumors) and malignant (cancerous tumors). The differences between both types are the ability to spread to many organs. A malignant tumor is able to invade and metastasize to other organs.⁽¹⁾

Cancer cells need angiogenesis (the growth of new blood vessels from pre-existing blood vessels) to supply oxygen and nutrition which support their growth and to metastasize. Angiogenesis starts with cancer hypoxia condition that stimulates Vascular Endothelial Growth Factor (VEGF) production. VEGF will bind to VEGF Receptor-2 (VEGFR-2) in endothelial cells (EC), then promotes proliferation, differentiation and migration of EC to form new branch of blood vessels (angiogenesis). Another element that plays an important role in angiogenesis is Matrix Metalloproteinases (MMPs). MMPs will degrade the extracellular matrix (ECM) of basement membrane in order to lay down new blood vessels.⁽²⁾

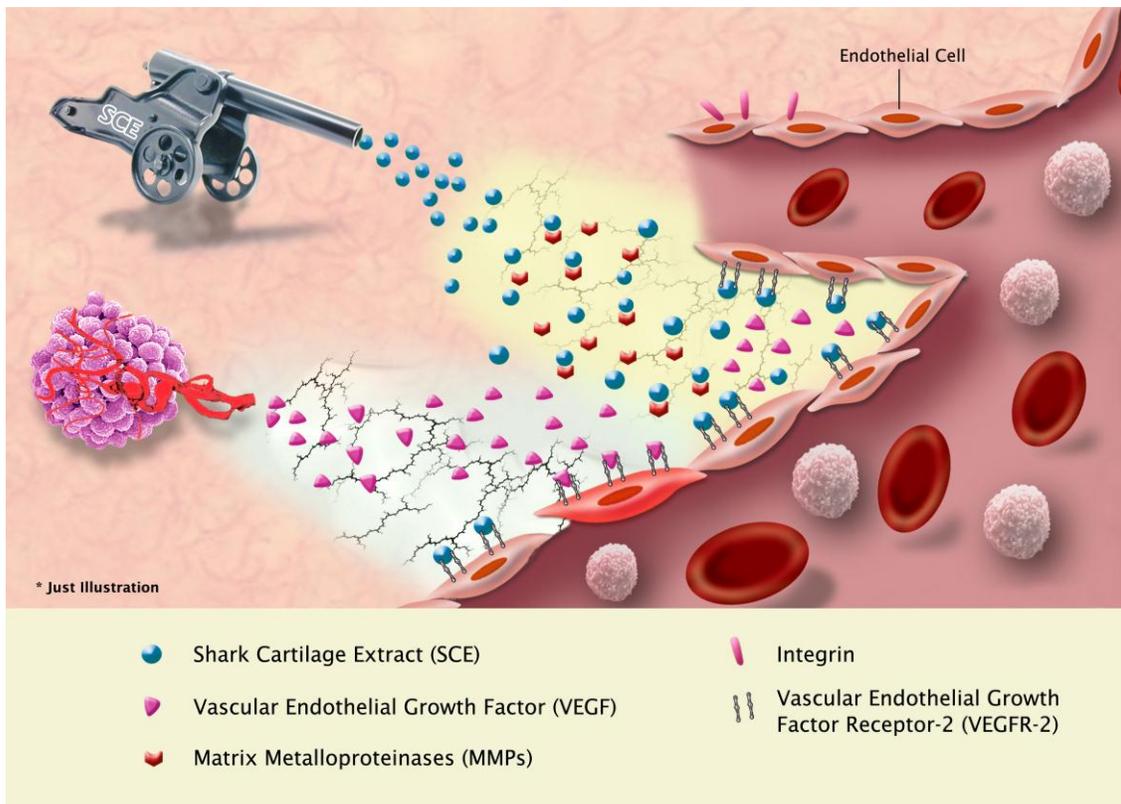


Fig.1. Mechanism of Action of SCE as an Angiogenesis Inhibitor.

Sharko[®] is isolated from shark cartilage. This extract contains proteoglycan and many proteins with angiogenesis inhibitor activities to prevent nutrition and oxygen delivery to the tumor/cancer cells.

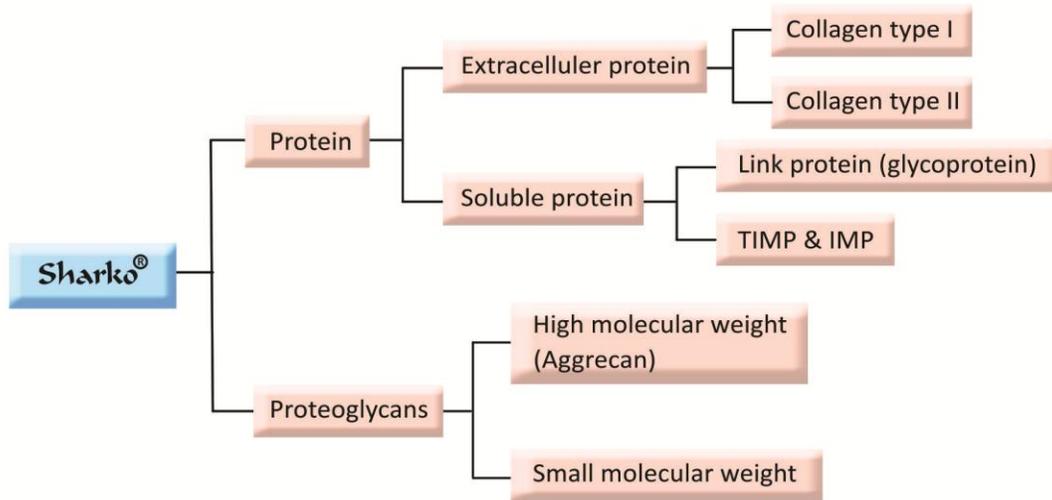


Fig.2. Bioactive Substances of Sharko[®]

The mechanism of shark cartilage extract (SCE) as angiogenesis inhibitor is: ^(3,4)

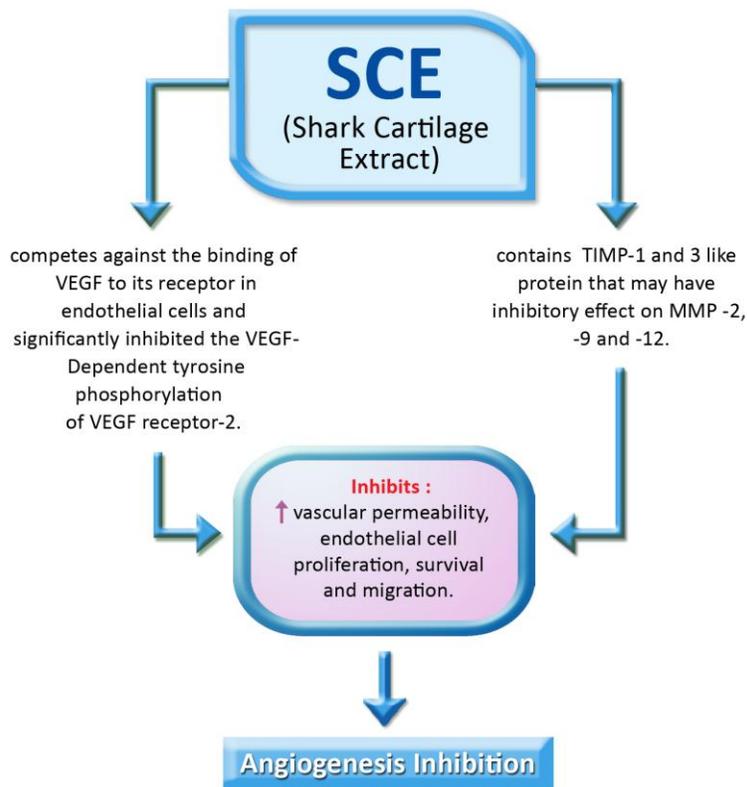


Fig.3. Mechanism of Action of SCE as an Angiogenesis Inhibitor.

If angiogenesis can be prevented, tumor cells will starve and expected outcomes will be:

1. prevention and reduction of cancer growth
2. shrinkage in cancer volume
3. prevention of metastasis

Due to its specific property as an angiogenesis inhibitor in cancer neovascularization, **Sharko[®]** is used as complementary therapy against cancer.

B. Sharko[®] inside as a Complementary Therapy in Psoriasis

Psoriasis is a chronic inflammatory disease characterized by hyperproliferation of keratinocytes. Body areas that are usually affected are scalp, nails, elbows, knees, and the back region. Chronic inflammation in psoriasis stimulates angiogenesis and collagen degradation. Collagen degradation results in impaired normal skin growth and hyper proliferation of keratinocytes which form psoriatic plaque on the body surface.⁽⁵⁾

Sharko[®], with its angiogenesis inhibitor activity, is used as a complementary therapy against psoriasis.