ANTI-ANGIOGENESIS PROPERTIES OF A COMMON WEED, *CONVOLVULUS AREVENSIS*

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Convolvulus is derived from the Latin, *convolvere*, meaning to entwine, and *arvensis* means "of fields." (1) The genus *Convolvulus* contains about 250 species. *Convolvulus* is a ubiquitous weed, but *arvensis* is understood to contain alkaloids that are toxic. However, extracts of the plant largely comprised of proteoglycan molecules (termed PGMs) appear non-toxic in animal studies and have been shown to have potent anti-angiogenesis effects. (2)

Many lay and professional people assume weeds have no therapeutic value. However, the difference between "weeds" and "herbs" may merely be our understanding of them. The basic definition of weed are that weeds are unwanted plants. Weeds are always considered as harmful, since they compete with crops for light, moisture and nutrients and harbor insects and diseases harmful to crops. For farmers and agriculture specialist weeds are unwanted plants but for herbalists, however, all weeds are useful plants. (3) Such is the case of *Convolvulus arvensis*, as new research is showing it has great promise as a useful, safe and non-toxic chemotherapeutic agent.

As tumors grow they secrete substances that promote new blood vessel growth (angiogenesis). Recruitment of new blood vessels play a crucial role in tumor survival and growth and every aspect of tumor growth requires rapid vascular development. Tumors secrete substances which block local regulatory control measures and allow of for unnaturally fast growth and replication. Many natural and chemical agents have been employed with the aim to halt or block angiogenesis in an attempt to arrest malignant growth, development and metastasis. One well-known natural substance promoted for its ability to halt tumor growth is shark cartilage. The data supporting shark cartilage is conflicting and its popularity has made it a high price item due to supply and demand laws of economics and the lack of abundant availability of the source. Finally, environmental and ecological concerns limit the usefulness of shark carti-

lage as a chemotherapeutic agent. Recently, however, a natural substance from a common weed has been found to inhibit angiogenesis 100 times more than shark cartilage and is widely available due to its ubiquitousness. (2) Because of this, extracts of this common weed (*Convolvulus arvensis*) hold great promise as a tool in the fight against cancer. Ironically, this herb has great promise in cancer but has a common name of "the cancer of weeds" among others.

Because of an anecdotal report of complete remission of human ovarian carcinoma after ingestion of an extract of *Convolvulus arvensis*, this "weed" was tested for its anti-angiogenic and immunogenic effects. It was found that a high molecular weight water extract of the plant contains almost no appreciable amount of alkaloids (devoid of its inherent toxicity) which are depleted during the extraction or manufacturing process. This proprietary extract is comprised primarily of proteoglycan molecules, termed PGMs, and marketed in the U.S. under the brand name *Vascustatin*. (4)

In a models of angiogenesis, mouse sarcoma, mouse Lewis lung carcinoma and human lymphoma, PMG was found to have potent anti-angiogenic and tumor inhibitory effects. Inhibition on angiogenesis was from 18–73%. Inhibition of tumor growth was 35–80% in the cancer models represented and lymphocytes were increased 12–46% in respective models.

In summary, extracts of a common weed, *Convolvulus arvensis*, show profound promise as anti-cancer agents largely through its ability to inhibit angiogenesis and its stimulatory effect on the immune system. The exact details regarding the anti-angiogenesis mechanism of bindweed extract are not completely understood. This extract should be studied further to elucidate its anti-tumor effects and mechanisms of action.

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