Researchers at the University of South Florida have developed a method for the prevention of tumor formation and malignant transformation through the modulation of signal transducer and activator of transcription 3 (STAT3) and Janus kinase (JAK) intracellular signaling.

Many of the modern anticancer drug discovery approaches have focused on targeting signal transduction pathways in cells involving various receptor kinases and other mechanisms. It is known that the signal transducers and activators of transcription (STAT) proteins regulate many aspects of cell growth, survival and differentiation. Moreover, JAK/STAT proteins have been found to play a key role in the regulation of gene expression. The dysregulation of the JAK/STAT3 protein pathway is frequently observed in many tumors and allows the tumors to develop enhanced survival mechanisms. This highlights the need for an effective method to inhibit the disruption of JAK/STAT3 protein pathways.

USF inventors have discovered a novel method using the pharmaceutical cucurbitacin I, or JSI-124, to suppress the JAK/STAT3 tumor survival pathway, therefore exhibiting potent antitumor activity. Further, research has showed that growth of cancer cells in a patient can be inhibited by local and systemic administration of JSI-124 compounds. Cucurbitacin I can modulate JAK/STAT3 activity both in vitro and in vivo. This method can treat multiple cancer types including pancreatic cancer, prostate cancer, lung cancer and breast cancer and can be administered intravenously, intramuscularly, orally, and intranasally.

**Advantages:**

- Suppresses the JAK/STAT3 cancer pathway
- Anti-tumor activity *in-vivo* and *in-vitro*
- Treats multiple cancer types
- Several administration routes

**A Novel and Potent Anti-Cancer Drug**

**Inhibition of STAT3 DNA-Binding Activity and STAT3-Mediated Transcription by JSI-124**

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