

## **A Natural Plant Metabolite Derivative Q2-3 Efficiently Prevents Metastasis of Mammary Tumor Cells**

A research team led by Dr. Ning-Sun Yang, a Distinguished Research Fellow at the Agricultural Biotechnology Research Center, and Dr. Yueh-Hsiung Kuo at China Medical University recently found that a natural plant product-derivative dihydrobenzofuran lignin (Q2-3) can prevent metastasis of mammary tumor cells. Intravenous injection of Q2-3 efficiently activated the secretion of endogenous anti-tumor factor (a factor already naturally present inside the organism), Interleukin-25, from tumor-associated fibroblasts. Dr. Yang's team further showed that when Q2-3 is used alongside the common chemotherapy drug docetaxel, an additive effect is observed, improving the effectiveness of the drug. The research was published in the journal *Nature Communications* on April 18, 2016.

Cancer metastasis refers to tumor cells from the original tumor site spreading to other organs of the body through local infiltration and so on. For example, when breast cancer cells spread into the lungs, they are called “metastatic breast cancers”, not “lung cancer”. Currently human breast tumors can be removed locally via surgery or chemotherapy treatments, but many breast cancer patients still suffer from tumor metastasis into the lungs, liver, bone, etc., even after surgery, and some patients eventually die.

Using a mouse model, Dr. Yang's research team found that tumor-associated fibroblasts, both in mice and in test-tube conditions, could be induced to secrete IL-25, an endogenous anticancer factor for mammary tumor cells. In addition, they found that a natural plant product-derivative named dihydrobenzofuran lignin (Q2-3) that can be easily obtained by the dimerization of methyl caffeic acid via a one-step chemical reaction could induce the secretion of IL-25. Intravenous injection of Q2-3 efficiently activated the secretion of IL-25 from tumor-associated fibroblasts in Q2-3-treated mice. Secretion of IL-25 plays a key role in Q2-3-mediated anti-metastatic activity. Subsequent experiments in mice further showed that such anti-metastatic effects of Q2-3 were additive on human tumor cells when employed in combination with a commonly clinically-used chemotherapy drug, docetaxel.

The use of fibroblasts for secretion of naturally occurring anticancer factors may have the potential to become a new approach for cancer therapy. Academia Sinica has already applied for an international patent for this research finding. Future research will also aim to translate the potent anti-metastatic activity of Q2-3 into possible clinical applications.

The first author of the article, Dr. Shu-Yi Yin, is a postdoctoral fellow at the Agricultural Biotechnology Research Center, Academia Sinica. This work was supported by Academia Sinica investigator award and the Ministry of Science and Technology of Taiwan.

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The full article entitled “Induction of IL-25 Secretion from tumor-associated fibroblasts suppresses mammary tumor metastasis” is available at the *Nature Communications* website at: <http://www.nature.com/ncomms/2016/160418/ncomms11311/full/ncomms11311.html>