Spotlight

By Gina Kirchweger

Artemisinin: From Malaria to Cancer Treatment?

Rasheed *et al*.
10.1002/ijc.25315 (Resolve a DOI—http://dx.doi.org)

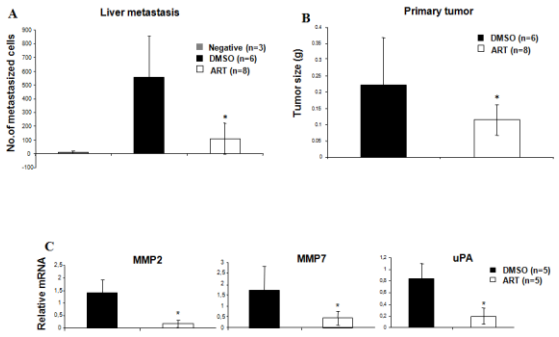
Best known as powerful anti-malarial drugs, artemisinin derivatives, such as artesunate (ART), have recently been garnering attention as a potential anticancer treatment. Currently, the first stage I clinical trial testing ART as an add-on therapy in advanced breast cancer is underway at the University of Heidelberg, Germany.

While *in vitro* studies have shown that ART exerts profound cytotoxicity in addition to anti-proliferative and anti-angiogenic activities against tumor cells, it had never been investigated as to whether ART can inhibit invasion and metastasis, the most dreaded effect of cancer. Metastasis is of particular concern in lung cancer since most lung carcinomas are diagnosed at an advanced stage.

In their study, Rasheed *et al*. are the first to show that ART significantly inhibits invasion and metastasis *in vitro* and *in vivo* in non-small-cell lung cancer (NSCLC). This effect was, at least in part, mediated by the downregulation of urokinase-type plasminogen activator (u-PA) and matrix metallo-proteinases (MMPS)-2 and 7, all of which are known to aid in the degradation of extracellular matrix—a prerequisite for tumor cells' ability to leave the confines of the primary tumor and slip away. Further experiments suggested that ART inhibiting the transcription factors AP-1 and/or NF-κB played an important role in the observed decrease in u-PA, MMP-2 and MMP-7.

If the laboratory promise of ART for the treatment of cancer holds up in clinical studies, derivatives of artemisinin, which are being well tolerated by malaria patients worldwide, could become a safe and desperately needed addition to the current arsenal of chemotherapeutic drugs without their debilitating side effects.

Fig.6



Artesunate inhibits metastasis and primary tumor growth *in vivo*: H460 cells were used to either generate primary tumors on the upper CAM (chicken chorioallantoic membrane), or metastasis in the livers, in chicken embryos.