

Shao Laboratory

Research Interests: *Angiogenesis, Metastasis, Breast Cancer*

Breast cancer is one of the most life-threatening diseases among women in this country and the incidence of the disease is still gradually increasing every year. Although early diagnosis and treatment of breast cancer have much improved, mortality at the later stage of the cancer remains static. In the better understanding of breast cancer progression, our lab focuses on the identification of molecular mechanisms in cancer angiogenesis and metastasis. Tumor angiogenesis, the new vasculature formation from pre-existing blood vessels, is a fundamental process required for tumor growth. The angiogenic switch is initially triggered by the ectopic production and elaboration of angiogenic factors that are mainly derived from tumor cells such as growth factors VEGF and bFGF. Those angiogenic molecules bind to specific membrane tyrosine kinase receptors to induce angiogenic signaling cascades in endothelial cells, a major component of the blood vasculature. The new vasculature developed by the endothelial cells in turn facilitates tumor growth and expansion. In addition, the tumor angiogenesis is frequently associated with tumor metastasis, a process that is mainly characterized by tumor cells. Metastatic tumor cells are capable of defying constraints of tissue boundaries and migrating into a new terrain to develop secondary colonies.

We have found that the molecules secreted from cancerous cells such as periostin are markedly elevated in cancer patients and they exert angiogenic and metastatic function in cancer progression. The increased levels of those factors in the blood will serve as biomarkers for the diagnosis and prognosis in the later stage of cancer development.

Selected Publications

W. Yan and **R. Shao**: Transduction of a mesenchyme-specific gene periostin into 293T cells induces cell invasive activity through epithelial-mesenchymal transformation. *J. Biol. Chem.* 281:19700-19708, 2006

R. Shao and Xing Guo. Human microvascular endothelial cells immortalized with hTERT: a model for the study of in vitro angiogenesis. *Biochem. Biophys. Res. Co.* 321, 788-794, 2004.

R. Shao, S. Bao, X. Bai, C. Blanchette, R. Anderson, J. R. Mark and X-F Wang. Acquired expression of periostin by breast cancers promotes tumor progression via enhancement of angiogenesis. *Mol. Cell. Biol.* 24, 3992-4003, 2004.

S. Bao, G. Ouyang, X. Bai, H. Zhi, C. Ma, M. Liu, **R. Shao**, R. Anderson, J. N. Rich and X-F. Wang. Periostin potently promotes metastatic growth of colon cancer by augmenting cell survival via the Akt/PKB pathway. *Cancer Cell* 5, 329-339, 2004.

Professional Highlights

Symposium platform presentation at the American Association for the study of Liver diseases. 1999.

Symposium platform presentation at the Era of Hope, DOD breast cancer research meeting. 2002.



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Education

M.D., Shanghai Second Medical
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Research Associate, Liver Center
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