

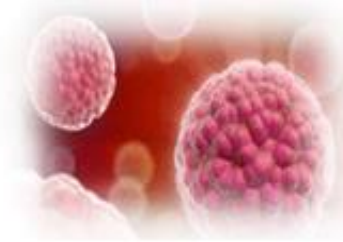
Biology and Durg Discovery of Cancer Stem Cells

Wen-Wei Chang

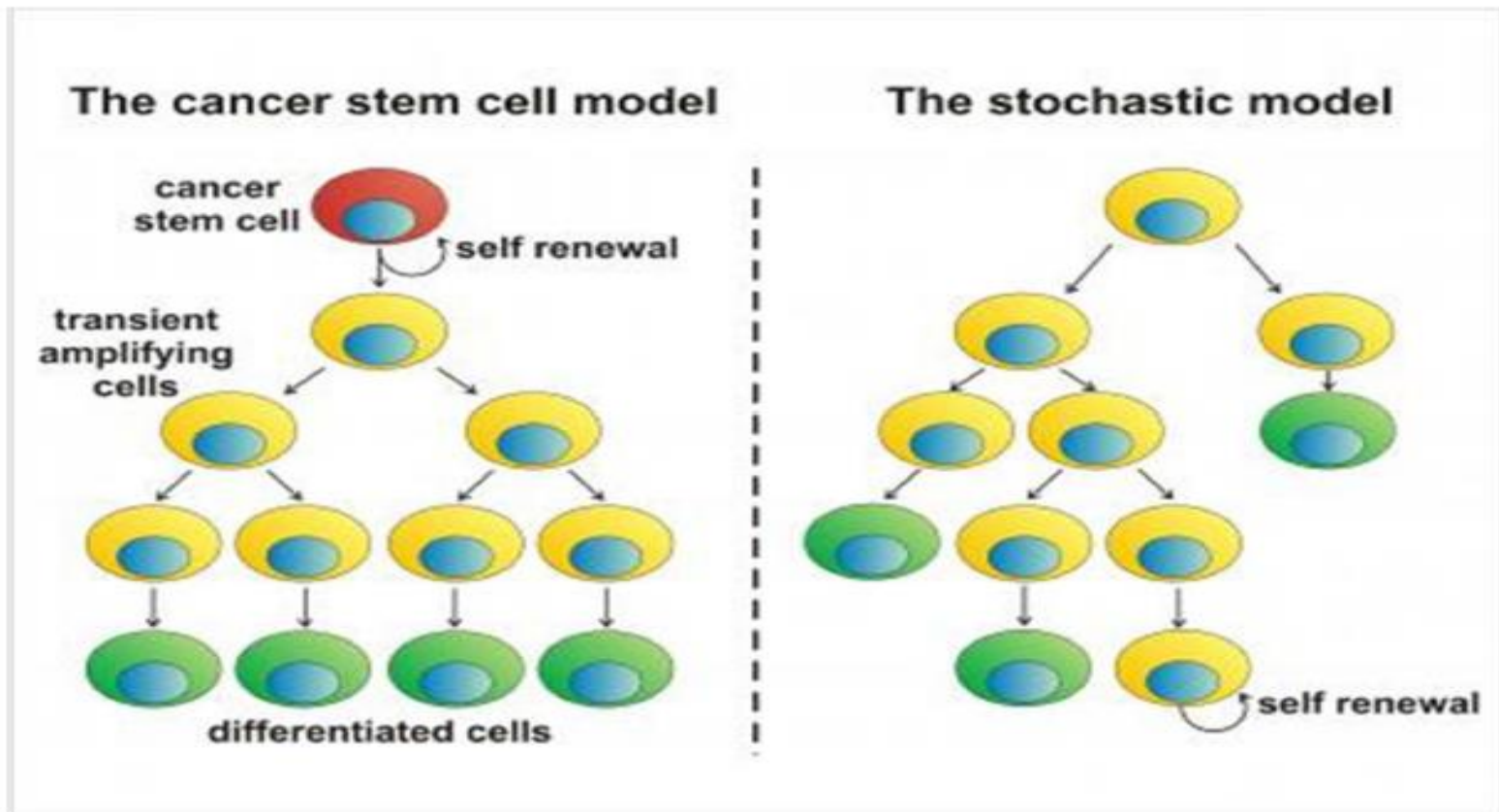
Associate Professor

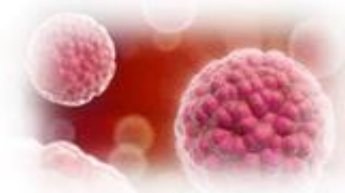
School of Biomedical Sciences Chung
Shan Medical University Taichung,
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Models of heterogeneity in cancer

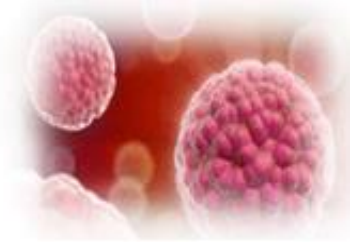




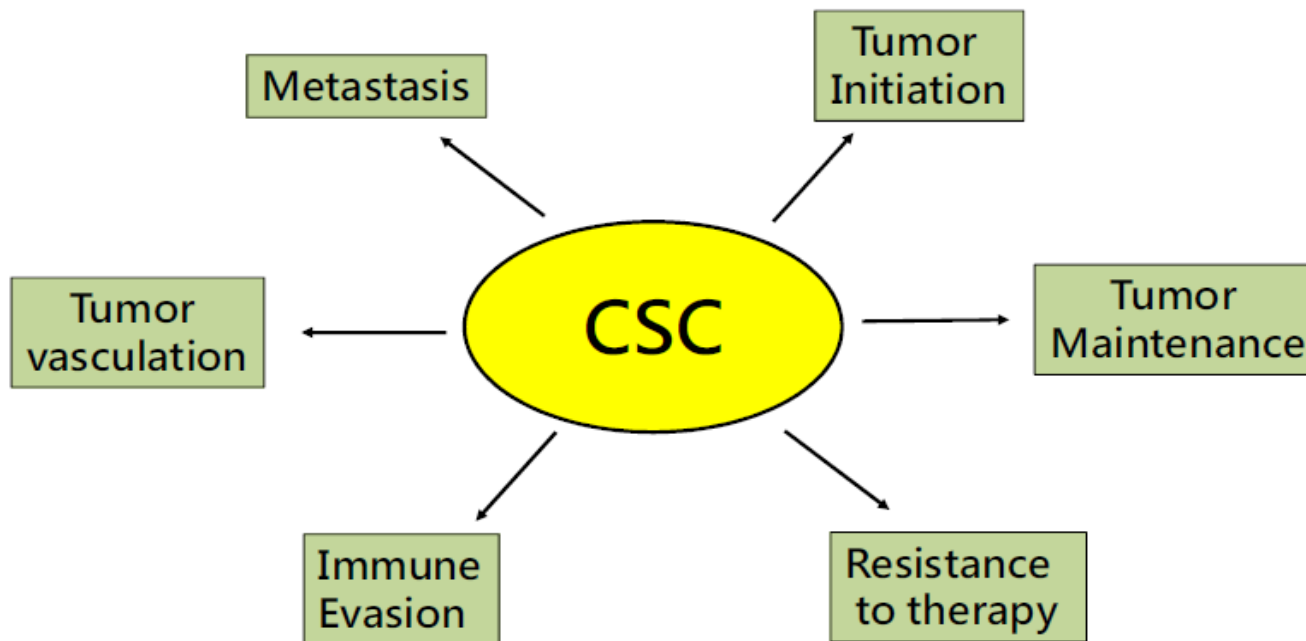
Cancer stem cells have been discovered among varieties of cancers

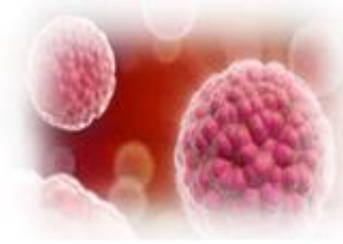
Tumour type	CSC marker	Tumour cells expressing CSC marker, %	Minimal number of cells expressing CSC markers for tumour formation	Injected in Matrigel	Transplantation site	Strain	Refs
Breast	CD44 ⁺ /CD24 ^{-low}	11–35	200	+	Mammary fat pad	NOD-SCID	19
Breast	CD44 ⁺ /CD24 ⁻	ND	2 × 10 ³	–	Mammary fat pad	NOD-SCID	77
Breast	ALDH1 ⁺	3–10	500	+*	Mammary fat pad	NOD-SCID	33
Brain	CD133 ⁺ (GBM)	19–29	100	–	Brain	NOD-SCID	20
	CD133 ⁺ (MB)	6–21	100	–	Brain	NOD-SCID	20
Brain	CD133 ⁺	2–3	500	–	Brain	nu/nu	24
Colon	CD133 ⁺	1.8–25	200	+	Kidney capsule	NOD-SCID	26
Colon	CD133 ⁺	0.7–6	3 × 10 ³	–	Subcutaneous	SCID	27
Colon	EpCAM ^{hi} /CD44 ⁺	0.03–38	200	+	Subcutaneous	NOD-SCID	32
Head and neck	CD44 ⁺	0.1–42	5 × 10 ³	+	Subcutaneous	Rag2/γ ⁻ -DKO, NOD-SCID	117
Pancreas	CD44 ⁺ /CD24 ⁺ /ESA ⁺	0.2–0.8	100	+	Pancreas	NOD-SCID	65
Pancreas	CD133 ⁺	1–3	500	–	Pancreas	NMRI-nu/nu	28
Lung	CD133 ⁺	0.32–22	10 ⁴	–	Subcutaneous	SCID	42
Liver	CD90 ⁺	0.03–6	5 × 10 ³	–	Liver	SCID/Beige	53
Melanoma	ABC5 ⁺	1.6–20	10 ⁵	–	Subcutaneous	NOD-SCID	35
Mesenchymal	Side population (Hoechst dye)	0.07–10	100	–	Subcutaneous	NOD-SCID	118

*Also injected with fibroblasts. ALDH, aldehyde dehydrogenase; CSC, cancer stem cell; EpCAM, epithelial cell adhesion molecule; ESA, epithelial specific antigen; GBM, glioblastoma multiforme; MB, medulloblastoma, ND, not determined; NOD-SCID, non-obese diabetic-severe combined immunodeficient; Rag2/γ⁻-DKO, Rag 2 common cytokine receptor γ-chain double knockout.



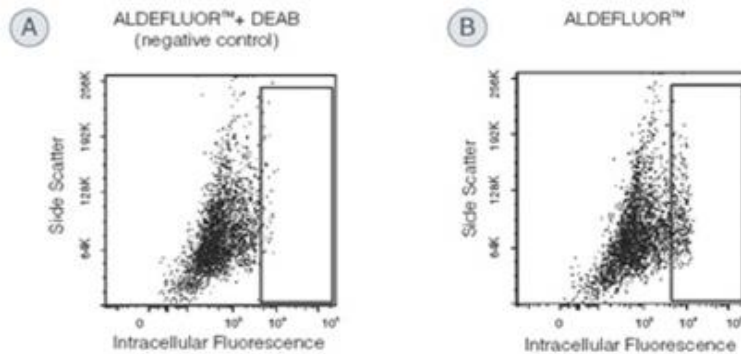
Impacts of cancer stem cells in cancer biology





How to analyze the population of cancer stem cells?

Specific markers (ALDEFLUOR assay)

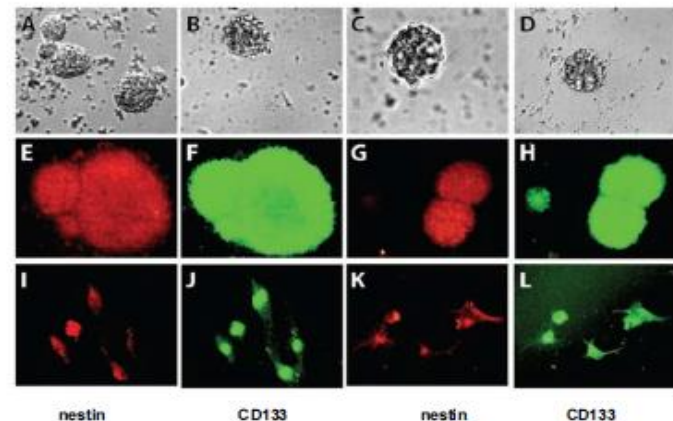


www.stemcell.com

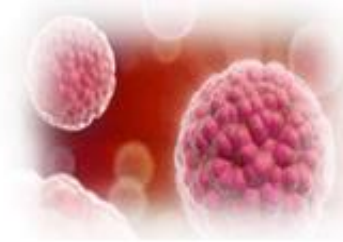
spheroid cultivation



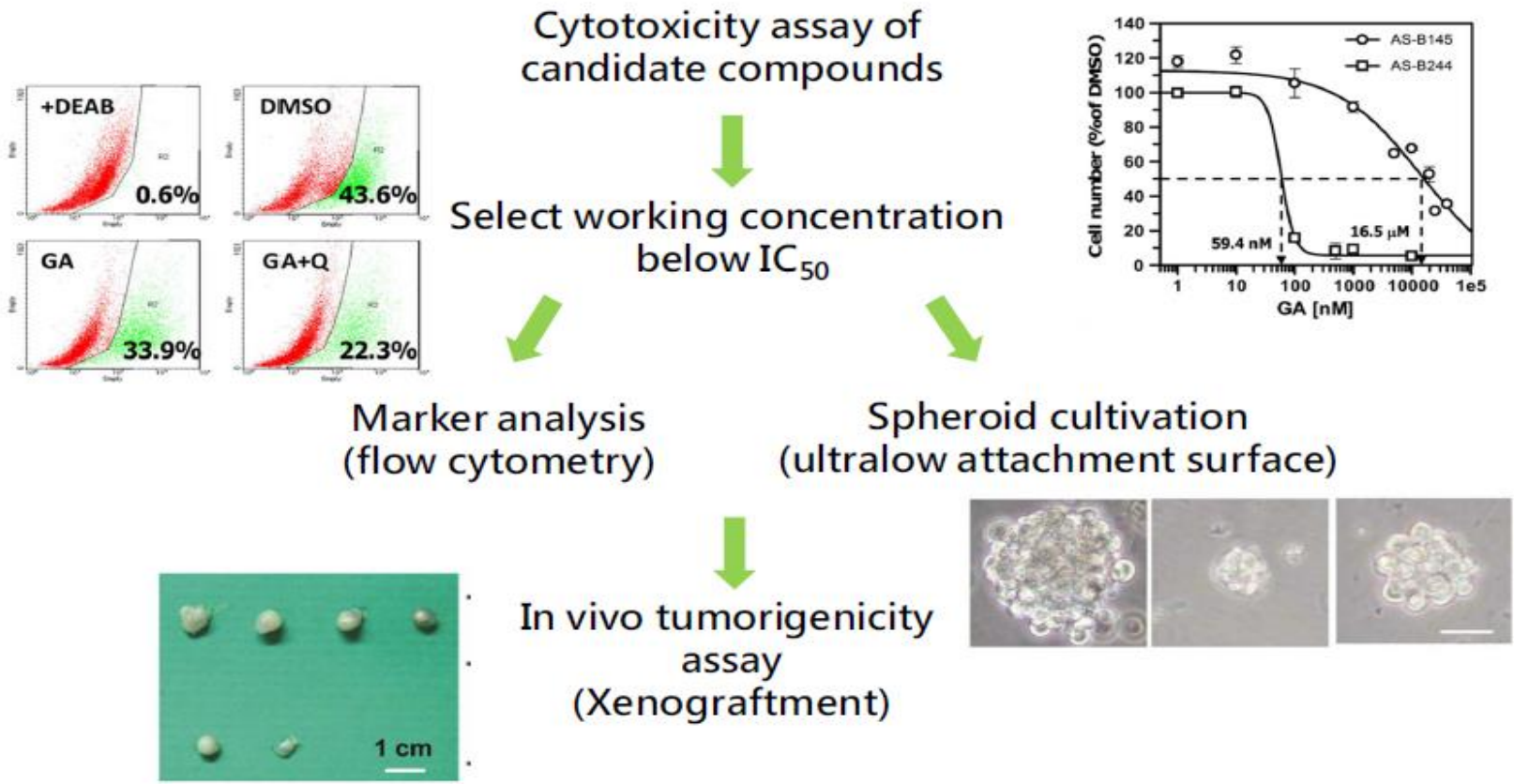
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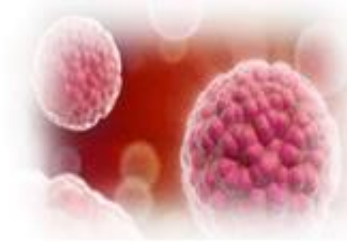


CANCER RESEARCH 2003. 63:5821-5828



Drug discovery in targeting cancer stem cells





Original Article

Quercetin in elimination of tumor initiating stem-like and mesenchymal transformation property in head and neck cancer

Wen-Wei Chang PhD^{1,2}, Fang-Wei Hu DDS, PhD^{3,4,†}, Cheng-Chia Yu PhD^{3,4,5,†}, Hsiu-Huan Wang BS¹, Hsiang-Pu Feng BS¹, Chih Lan BS¹, Lo-Lin Tsai DDS, PhD^{3,4} and Yu-Chao Chang DDS, PhD^{3,4,*}

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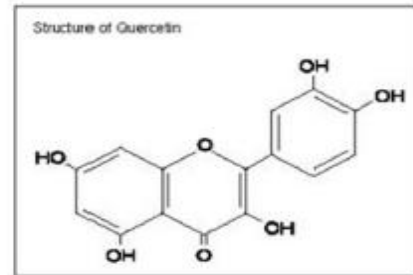
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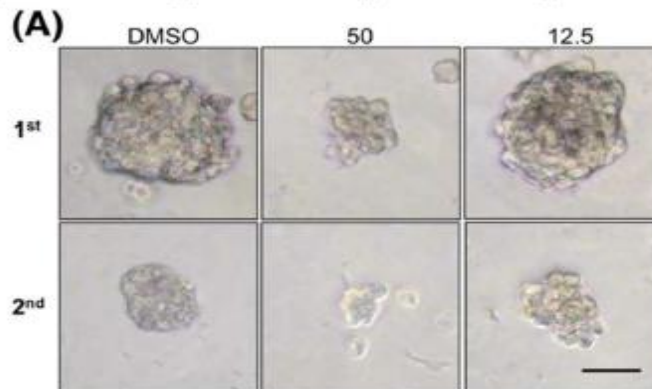
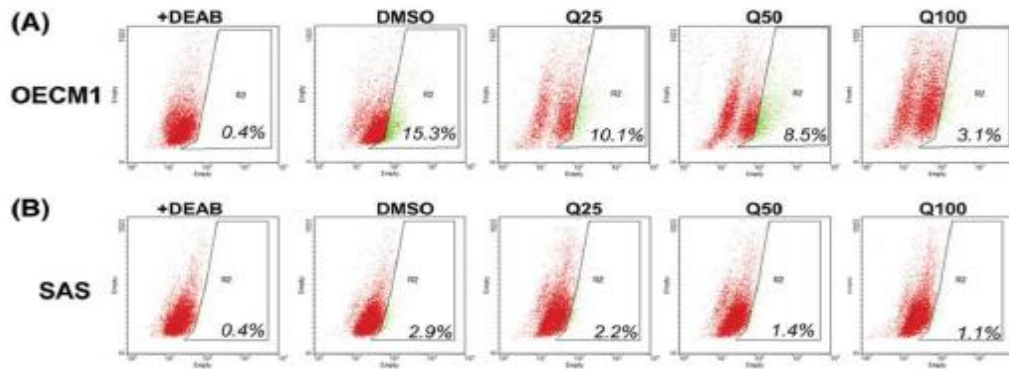
Issue

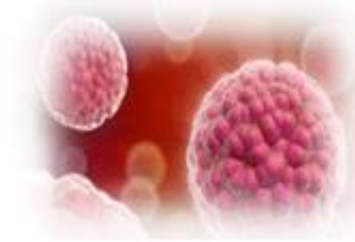


Head & Neck
Volume 35, Issue 3, pages 413–419.
March 2013



<http://www.thenaturalbladder.com/>



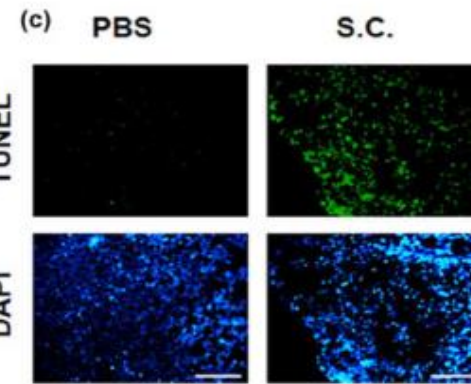
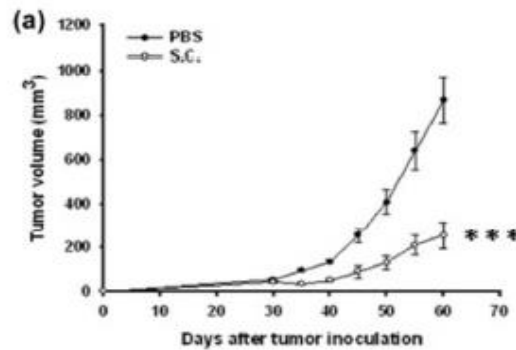
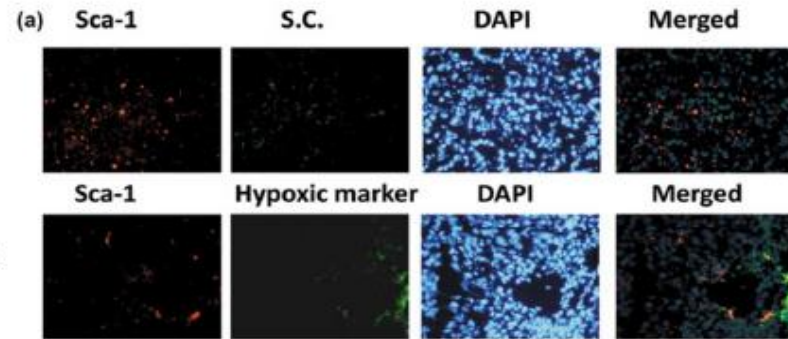
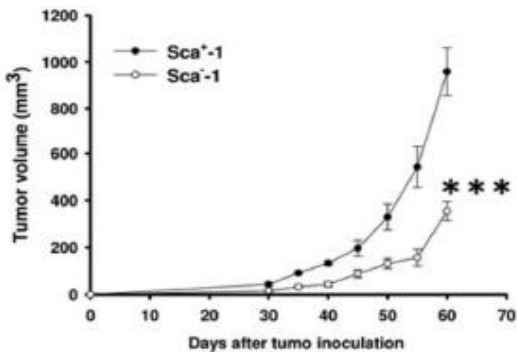
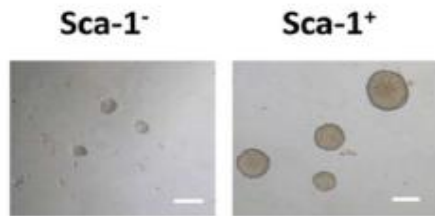
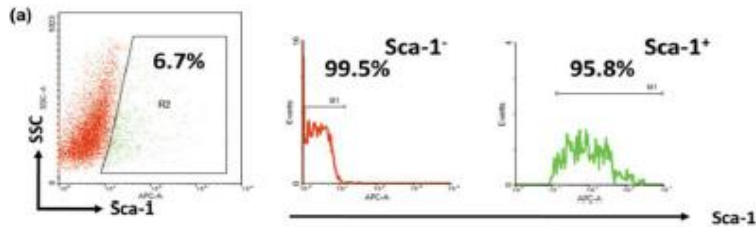


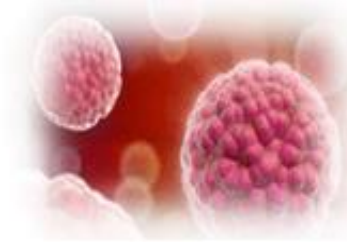
Tracking of mouse breast cancer stem-like cells with *Salmonella*

Wen-Wei Chang^{1,2}, Yu-Diao Kuan³, Man-Chin Chen⁴, Song-Tao Lin⁴ and Che-Hsin Lee^{3,4}

¹Department of Biomedical Sciences, College of Medical Science and Technology; ²Department of Medical Research, Chung Shan Medical University Hospital, Taichung 40401; ³Department of Microbiology; ⁴Graduate Institute of Basic Medical Science, School of Medicine, China Medical University, 91 Hsueh-Shih Road, Taichung 40402, Taiwan

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Wei et al. *Breast Cancer Research* 2011, **13**:R101
<http://breast-cancer-research.com/content/13/S/R101>



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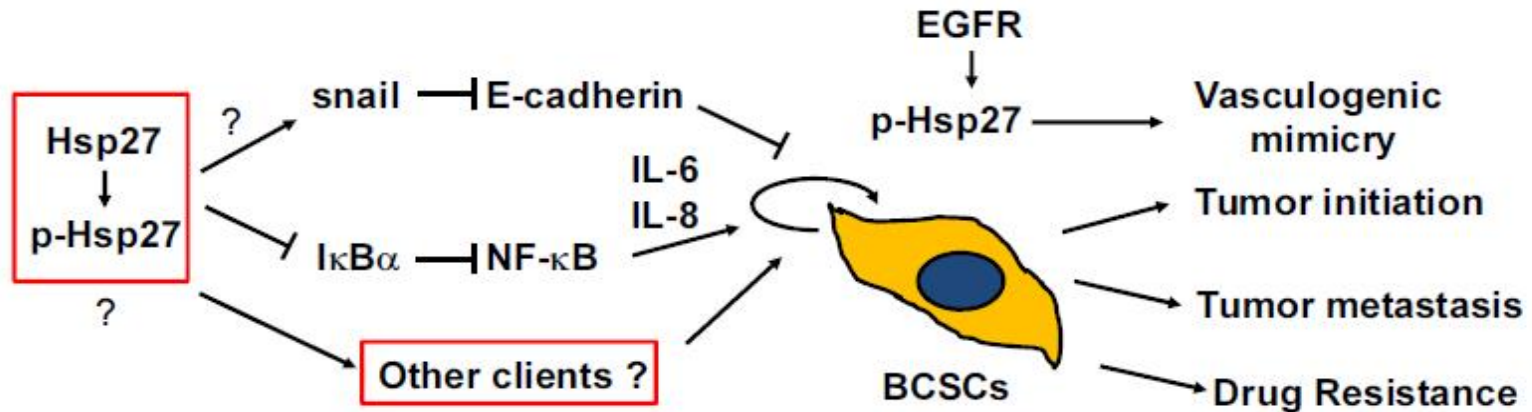
Hsp27 participates in the maintenance of breast cancer stem cells through regulation of epithelial-mesenchymal transition and nuclear factor- κ B

Li Wei^{1,2}, Tsung-Ta Liu², Hsiu-Huan Wang⁴, Hui-Mei Hong^{4,5}, Alice L. Yu⁶, Hsiang-Pu Feng⁸ and Wen-Wei Chang^{4,5*}

Research paper

Epidermal growth factor/heat shock protein 27 pathway regulates vasculogenic mimicry activity of breast cancer stem/progenitor cells

Che-Hsin Lee^{4,b}, Yu-Ting Wu^{4,c}, Hung-Chun Hsieh^{4,c}, Yun Yu⁶, Alice L. Yu^{4,e}, Wen-Wei Chang^{4,f,*}



- Targeting Hsp27 may be an interesting strategy in future breast cancer therapy.