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Research Interests: (Key words)	Lung cancer remains the leading cause of cancer death in the world. Although recent development of targeted therapies and immunotherapy had dramatically improved the prognosis in advanced lung cancer, therapies-induced drug resistance is still a main obstacle for long-term survival in patients with lung cancer. Broad body of researches have been conducted to discover the mechanisms or molecular alteration regarding the treatment related resistance in lung cancer. Lung cancer stem cells (CSCs), a subset of lung cancer cells, share characteristics of normal stem cells with a capacity of self-renewal and differentiation. Lung CSCs also display tumor-initiating ability and metastasis-forming potential, which may account for the therapy resistance and early metastasis in patients. In our previous reports, we have demonstrated that Oct-4 expression plays a crucial role in maintaining the self-renewing, cancer stem-like, and chemo- and radio-resistance properties of CD133 positive non-small cell lung cancer. We also found that lung CSCs have elevated levels of activated Hsp27 upon treatment with superoxide and traditional chemotherapy. When combined with chemotoxic agents, blockage of Hsp27 decreased the survival of lung CSCs, which otherwise were resistant to traditional chemotherapy. Recently, through studying the metabolic profile of lung CSCs and the related underlying mechanisms, we found that the Oct4-hexokinase 2 (HK2) pathway activated by collagen XVII-laminin-332 through FAK-PI3K/AKT-GSβ3β/β-catenin activation induced the upregulation of glycolysis and maintenance of CSC-like features. We also showed that collagen XVII, Oct4, and HK2 could be valuable markers to predict the prognosis of lung cancer patients. The need to understanding lung CSCs and the associated mechanisms to escape therapies is important in the hope to develop novel lung cancer therapies and enhance sensitivity to current chemotherapy, targeted therapy and immunotherapy.			
Selected Publications (in recent 5 yr):	<ol style="list-style-type: none"> <li>Po-Kuei Hsu, Ling-I Chien, Chih-Hung Lin, Yi-Chen Yeh, Cheng-Yen Chuang, <b>Han-Shui Hsu</b>, Yu-Chung Wu, Chung-Ping Hsu. Impact of perineural invasion as a histopathological prognostic factor in ypStage II/III oesophageal squamous cell carcinoma. <i>Eur J Cardiothorac Surg</i>. 2019 May 1;55(5):927-933.</li> <li>Chou KT, Cheng SC, Huang SF, Perng DW, Chang SC, Chen YM, <b>Hsu HS</b>, Hung SC. Impact of Intermittent Hypoxia on Sepsis Outcomes in a Murine Model. <i>Sci Rep</i>. 2019 Sep 9;9(1):12900. doi: 10.1038/s41598-019-49381-w.</li> <li>Chen-Chi Liu, Kun-Ta Chou, Jyuan-Wei Hsu, Jiun-Han Lin, Tien-Wei Hsu, David Hung-Tsang Yen, Shih-Chieh Hung, <b>Han-Shui Hsu*</b>. High metabolic rate and stem cell characteristics of esophageal cancer stem-like cells depend on the Hsp27-AKT-HK2 pathway. <i>Int J Cancer</i>. 2019 Oct 15;145(8):2144-2156.</li> <li>Yi-Ying Lee, Po-Kuei Hsu, Chien-Sheng Huang, Yu-Chung Wu and <b>Han-Shui Hsu</b>. Complications after Chest Tube Removal and Reinterventions in Patients with Digital Drainage Systems. <i>J Clin Med</i>. 2019 Dec 1;8(12):2092.</li> <li>Cheng IY, Liu CC, Lin JH, Hsu TW, Hsu JW, Li AF, Ho WC, Hung SC, <b>Hsu HS*</b>. Particulate matter increases the severity of bleomycin-induced pulmonary fibrosis through KC-mediated neutrophil chemotaxis. <i>Int J Mol Sci</i>. 2020 Jan; 21(1): 227.</li> </ol>			

6. **Han-Shui Hsu**, Chen-Chi Liu, Jiun-Han Lin, Tien-Wei Hsu, Jyuan-Wei Hsu, Anna Fen-Yau Li, Shih-Chieh Hung . Involvement of Collagen XVII in Pluripotency Gene Expression and Metabolic Reprogramming of Lung Cancer Stem Cells. *J Biomed Sci.* 2020 Jan 13;27(1):5. doi: 10.1186/s12929-019-0593-y.
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11. Huang CS, Hsu PK, Chen CK, Yeh YC, **Hsu HS**, Shih CC, Huang BS. Surgeons' preference sublobar resection for stage I NSCLC less than 3 cm. *Thorac Cancer.* 2020 Apr;11(4):907-917.
12. Hung CT, Chen CK, Chang YY, Hsu PK, Hung JJ, Huang CS, Wu YC, **Hsu HS**. Electromagnetic navigation-guided versus computed tomography-guided percutaneous localization of small lung nodules before uniportal video-assisted thoracoscopic surgery: a propensity score-matched analysis. *Eur J Cardiothorac Surg.* 2020 Aug 1;58(Supplement\_1):i85-i91
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Names of Lab members:

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