



Hsuan, Shih-Ling

Professor

Research Interests:

Molecular Pathology, Signal Transduction

Courses Taught:

Veterinary Pathology, Diseases of Swine, Cellular Signal Transduction and Regulation, Pathobiotechnology

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Educational Background

Ph D, Veterinary Pathobiology, University of Minnesota

MS, Veterinary Medicine, National Chung Hsing University (NCHU)

BS, Veterinary Medicine, NCHU

Professional Career

Professor, Graduate Institute of Veterinary Pathobiology, NCHU

Associate Professor, Graduate Institute of Veterinary Pathobiology, NCHU

Assistant Professor, Graduate Institute of Veterinary Pathobiology, NCHU

Senior Fellow, Department of Environmental and Occupational Health Sciences, School of Public Health, University of Washington

Research Interest

Actinobacillus pleuropneumoniae (App) causes fibrinous, hemorrhagic, and necrotizing pleuropneumonia in all ages of pigs. Exotoxins termed *Actinobacillus pleuropneumoniae* toxins (Apx) are major virulence factors of App that contribute to the pathogenesis of porcine pleuropneumonia. Different serotypes of App produce two to three types of Apx toxins. Among these Apx toxins, ApxI elicits its most significant effects on hemolysis and cytolysis. My laboratory's research focuses on delineating the molecular mechanisms that underlie ApxI-induced effects on porcine alveolar macrophages (PAMs), one of the first-line defense cells in the lungs. My laboratory has demonstrated that ApxI induces apoptosis and production of proinflammatory cytokines in PAMs by activating NF- κ B and MAPK (p38 and JNK) pathways. Furthermore, porcine LFA-1 renders resistant cells susceptible to ApxI and mediates cell death by downregulating FAK and Akt activities. Porcine LFA-1 is a putative receptor for ApxI, whereas the molecular mechanism underlying the interaction of ApxI to pLFA-1 warrants further investigation.

Selected Publications

1. Li SC, Huang JF, Hung YT, Wu HH, Wang JP, Lin JH, Chen ZW*, Hsuan SL*. 2022. *In silico* capsule locus typing for serovar prediction of *Actinobacillus pleuropneumoniae*. Microbial Genomics 8(4):000780. (SCI)
2. Li SC, Cheng YT, Wang CY, Wu JY, Chen ZW, Wang JP, Lin JH, Hsuan SL*. 2021. *Actinobacillus pleuropneumoniae* exotoxin ApxI induces cell death via attenuation of FAK through LFA-1. Scientific Reports, 11:1753. (SCI)

3. Hsu CW, Li SC, Chang NY, Chen ZW, Liao JW, Chen TH, Wang JP, Lin JH, Hsuan SL*. 2016. Involvement of NF- κ B in regulation of *Actinobacillus pleuropneumoniae* exotoxin ApxI-induced proinflammatory cytokine production in porcine alveolar macrophages. *Veterinary Microbiology*, 195: 128-135. (SCI)
4. Lee JJ, Wu YC, Kuo CJ, Hsuan SL*, Chen TH*. 2016. TolC is important for bacterial survival and oxidative stress response in *Salmonella enterica* serovar Choleraesuis in an acidic environment. *Veterinary Microbiology*, 193: 42-48. (SCI)
5. Huang YS, Wu YC, Hu CW, Chan FT, Chou CH, Yeh KS, Chen TH, Hsuan SL*. 2016. Isolation and characterization of *Salmonella* spp. in sheltered wild birds in Taiwan. *Pakistan Veterinary Journal*, 36(4): 472-476. (SCI)
6. Chang NY, Chen ZW, Chen TH, Liao JW, Lin CC, Chien MS, Lee WC, Lin JH, Hsuan SL*. 2014. Elucidating the role of ApxI in hemolysis and cellular damage by using a novel apxIA mutant of *Actinobacillus pleuropneumoniae* serotype 10. *Journal of Veterinary Science* 15(1): 81-89. (SCI)
7. Wu CM, Chen ZW, Chen TH, Liao JW, Lin CC, Chien MS, Lee WC, Hsuan SL*. 2011. Mitogen-activated protein kinases p38 and JNK mediate *Actinobacillus pleuropneumoniae* exotoxin ApxI-induced apoptosis in porcine alveolar macrophages. *Veterinary Microbiology* 151(3-4): 372-378. (SCI)
8. Chen ZW, Chien MS, Chang NY, Chen TH, Wu CM, Huang C, Lee WC, Hsuan SL*. 2011. Mechanisms underlying *Actinobacillus pleuropneumoniae* exotoxin ApxI induced expression of IL-1 β , IL-8 and TNF- α in porcine alveolar macrophages. *Veterinary Research* 42: 25. (SCI)
9. Chien MS, Chan YY, Chen ZW, Wu CM, Liao JW, Chen TH, Lee WC, Yeh KS, Hsuan SL*. 2009. *Actinobacillus pleuropneumoniae* serotype 10 derived ApxI induces apoptosis in porcine alveolar macrophages. *Veterinary Microbiology* 135:327-333. (SCI)
10. Hsuan SL, Klintworth HM, Xia Z. 2006. Basic fibroblast growth factor protects against rotenone-induced dopaminergic cell death through activation of extracellular signal-regulated kinases 1/2 and phosphatidylinositol-3 kinase pathways. *Journal of Neuroscience* 26(17):4481-4491. (SCI)
11. Hetman M[#], Hsuan SL[#], Habas A, Higgins MJ, Xia Z. 2002. Extracellular signal regulated kinase 1/2 antagonizes glycogen synthase kinase 3 β -induced apoptosis in cortical neurons. *Journal of Biological Chemistry* 277:49577-49584. (SCI) [#]: equal contribution.
12. Hsuan SL, Kannan MS, Jeyaseelan S, Prakash YS, Sieck GC, Maheswaran SK. 1998. *Pasteurella haemolytica* A1-derived leukotoxin and endotoxin induce intracellular calcium elevation in bovine alveolar macrophages by different signaling pathways. *Infection and Immunity* 66:2836-2844. (SCI)
13. Hsuan SL, Kannan MS, Jeyaseelan S, Prakash YS, Malazdrewich C, Abrahamsen MS, Sieck GC, Maheswaran SK. 1999. *Pasteurella haemolytica* leukotoxin and endotoxin induced cytokine gene expression in bovine alveolar macrophages requires NF- κ B activation and calcium elevation. *Microbial Pathogenesis* 26:263-273. (SCI)