

***Nemopilema nomurai* jellyfish venom induced apoptotic effect in TNF- α -stimulated rat vascular smooth muscle cells.**

Hyeryeon Yang¹, Hyunkyong Lee¹, Du Hyeon Hwang¹, Jae Kuk Byun¹, Hyeong jun Yim¹, Min Jin Kim¹, Euikyung Kim^{1,3}, Changkeun Kang^{*1,2}

¹Department of Pharmacology and Toxicology, College of Veterinary Medicine, Gyeongsang National University, Jinju, 660-701, Republic of Korea; ²Institutes of Agriculture and Life Science, Gyeongsang National University, Jinju 660-701, Republic of Korea; ³Institutes of Animal Medicine, Gyeongsang National University, Jinju 660-701, Republic of Korea

Introduction: Atherosclerosis is one of the chronic vascular diseases characterized by major cause of human death worldwide. Also, apoptosis in atherosclerosis lesion is triggered by inflammatory processes. Apoptosis is programmed form of cell death that occurs in all major cell types of atherosclerotic plaques where it is implicated in the development and progression of the disease. Our previous study demonstrated that *Nemopilema nomurai* jellyfish venom (NnV) has anti-migration and anti-proliferation effect *in vitro*. Thus, the present study aims to investigate the impact of NnV of TNF- α -induced of rat vascular smooth muscle cell (A7r5) involved their probable signaling pathways.

Materials and Methods: Gelatin zymography, western blot, DAPI staining were performed in A7r5 cells exposed to TNF- α . Briefly, A7r5 cells were starved in serum free media for 24 h and then treated with NnV (0.25 μ g/ml) for 24 h in the presence or absence of TNF- α .

Results: We first confirmed MMP-9 level. TNF- α markedly induced MMP-9 level in A7r5 cells, whereas NnV was able to block TNF- α -stimulated MMP-9 level in a dose-dependent manner. Second, we examined the apoptosis pathway of regulation of TNF- α -induced A7r5 cell. Bax was decreased by TNF- α treatment with NnV 0.25 μ g/ml and Bcl-xL was increased by TNF- α treatment with NnV 0.25 μ g/ml. Finally, we examined the DAPI staining. TNF- α induced A7r5 cells treated with NnV revealed apoptotic changes in these cells, including condensed and fragmented nuclei.

Conclusions: Our results suggest that NnV is capable of preventing selectively induced inflammation cells apoptosis of vascular smooth muscle cells. We conclusive statement more research will be needed to apoptosis pathway molecular mechanism of NnV, which is not yet clearly understood. Therefore, NnV appears to have potential as a therapeutic agent.

References

- [1] Stoneman, Victoria EA, and Martin R. Bennett. "Role of apoptosis in atherosclerosis and its therapeutic implications." *Clinical science* 107.4 (2004): 343-354.

- [2] Wang, L. I., et al. "Vascular smooth muscle-derived tissue factor is critical for arterial thrombosis after ferric chloride-induced injury." *Blood* 113.3 (2009): 705-713.

Prevalence and molecular type of livestock associated methicillin-resistant *Staphylococcus aureus* isolated from pigs and pig farm workers in Korea

Dong Chan Moon¹, Soo Kwan Jeong², Bang-Hun Hyun¹, Suk-Kyung Lim^{*1}

¹Bacterial Disease Division, Animal and Plant Quarantine Agency, Republic of Korea; ²Yang Ju Livestock Industry Cooperatives

Introduction: Methicillin-resistant *Staphylococcus aureus* (MRSA) have emerged as a zoonosis pathogen in both clinical and veterinary infections. Since 2004, numerous studies of MRSA have shown animal-to-human transmission. Furthermore incidence of MRSA in animals has increased in Korea recently. Therefore, the aims of this study were to investigate the prevalence and to characterize the MRSA isolates from pigs and pig farm workers in Korea.

Materials and Methods: A total of 1,246 pig and farm worker nasal swab samples were collected from 53 pig farms in nine provinces during 2012-2016. MRSA were isolated using enrichment broth and selective agar containing ceftiofur. Methicillin resistance was confirmed by MIC values and presence of *mec* gene by PCR. In addition, multilocus sequence typing and spa-typing were performed to determine the genetic relatedness of the isolated MRSA strains.

Results: The prevalence of MRSA was 7.9% (89/1,120) in pigs and 16.7% (21/126) in farm workers, respectively. No MRSA was detected in four organic farms in both pigs and farmers. Pig-level prevalence different among age groups, the portion of positive samples was higher in weaners (17.3%) than in piglets (6.5%), growers (9.0%), finishers (4.8%) and sows (0%). Of the 119 persons who working at conventional farms, 21 (17.6%) were positive for MRSA. While no MRSA was isolated in seven farmers who working at organic farms. Two different lineages were found among the 109 MRSA isolates from pigs and farmworkers: 58 and 11 strains of livestock-associated type (ST398 or ST541/spa t034 or t571 or t8588 or t034 variant) and 30 and 10 strains of human-associated type (ST72 or ST188/spa t148 or t189 or t324 or t664 or t5440), respectively. Furthermore, identical genotypes were detected in both pigs and farm workers in six farms.

Conclusions: To our knowledge, this is the first report of LA-MRSA in farm workers in Korea. The detection of the identical genotypes of MRSA in pigs and pig farmers suggest animal and human transmission. LA-MRSA could be potential threat to the public health in Korea.