

using an absorbable suture materials. One of the two animals recovered normally after the operation, but the abdominal distension recurred in the patients with severe hyperglycemia and expired on the fourth postoperative day. The autopsy findings showed that the intestine was filled with gas, and no abnormalities were not found in the surgical site of the bladder.

Conclusions: This case suggests that the azotemia caused by bladder rupture after laparoscopic surgery in bears can cause death.

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Development of an EX vivo Porcine Lung Model for Studying Respiratory Viral Infections

Myeon-Sik Yang¹, Zhou Zixiong¹, Amina Khatun¹, Salik Nazki¹, Chang Gi Jeong¹, Won Il Kim¹, Sang Myeong Lee², Chae Woong Lim¹, Bumseok Kim^{1*}

¹College of Veterinary Medicine, Chonbuk National University, Iksan, Korea; ²College of Environmental & Bioresource sciences, Chonbuk National University, Iksan, Korea

Introduction: Development of vaccine targeting respiratory virus is essential for controlling respiratory disease and enormous experiments have been tried with *in vivo* situation. However, *in vivo* experiments have economical and ethical problems. So our study was aimed to know the possibility to use *ex vivo* lung culture system and relevant culture conditions.

Materials and Methods: Lung tissues (150-200mg) were prepared and washed 2 times with PBS in sterile condition on naïve pig. To prevent floating of lung tissues in well plate, 0.8% agarose gel was placed on bottom of the each well. Then 500-700 µl of individual medium was added in each well and incubated at CO₂ incubator (37°C, 5% CO₂). The 8 media were tested to confirm which medium was

optimal for *in vitro* lung culture and virus infection condition. Various medium ingredients were as follows: ① F12K (1x), ② F12K (2x)+RPMI-1640 (2x), ③ F12K (1x)+RPMI-1640(1x), ④ RPMI-1640 (1x), ⑤ F12K (1x)+10% porcine naïve serum, ⑥ F12K+RPMI-1640 (2x)+10% porcine naïve serum, ⑦ F12K (1x)+RPMI-1640 (1x)+10% porcine naïve serum, ⑧ RPMI-1640 (1x)+10% porcine naïve serum. One day after culture, the lung tissues were infected with porcine reproductive and respiratory syndrome (PRRS) virus at the titers of 1×10⁴TCID₅₀/ml.

Results: By observing interstitial pneumonia patterns, we confirmed that F12K medium was essential for tissue growing and virus infection. Among the F12K including media, F12K (1x)+10% porcine naïve serum medium showed better tissue viability and virus virulence compared to other media.

Conclusions: The present study shows that lung slices can be used to investigate respiratory virus infections. Agarose-mounted lung slices can successfully be maintained in culture and can be productively infected with viruses.

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Review of the current situation and improvements of regulatory management system for veterinary medical devices in Korea

Jin San Moon^{*}, Kyoung Mook Kang, Tae Young Suh, Myoung Heon Lee

Veterinary Pharmaceutical Management Division, Animal and Plant Quarantine Agency

Introduction: The use of veterinary medical devices has been increasing due to the increasing demand for high quality medical services of companion animal owners. However, the information on regulatory management for veterinary medical devices has been limited. Therefore, this study reviewed the current situation, problems, and improvements of regulatory management system for veterinary medical devices in Korea.

Materials and Methods: In this study, we investigated and analyzed the laws, regulations, recommendations in relation to Korean human and veterinary medical devices and other countries such as U.S.A., EU, and Japan. The literature search was performed to review various types of definition, criteria of classification & scope, regulatory approval process to permit, standard and specification, application of good manufacturing practices (GMP) requirement, safety & efficacy review, labeling requirements, and marketing management on veterinary medical devices and so on.

Results: The regulations for veterinary medical devices are established by the Animal and Plant Quarantine Agency in 2000 based on the Medical Appliance Act. Veterinary medical devices were classified approximately 1,500 items

as four categories (instruments, supplies, *in vitro* diagnostic medical reagents, medical devices only used for animal). Furthermore, they have been classified 4 grades (I-IV) to minimize the occurrence of side effects and defects in veterinary medical devices and provided standards for electromechanical, electromagnetic and biological safety and individual standards for 72 veterinary medical devices (26 electric medical devices, 16 non-electric medical devices, 6 medical supplies, 24 medical devices only used for animal). Nevertheless, when the approval of application for animal in medical devices for human for efficient management system, it should be reflected the differences of physiological index and anatomical structures between humans and animals for the prevention of side effects in veterinary medical devices. Furthermore, the safety and efficacy management systems should be established the good manufacturing practices system and tracking management system should be applied.

Conclusions: This study suggested that there are consistently necessary to introduce the advanced regulation management systems on the various kinds of veterinary medical instruments, medical supplies, and *in vitro* diagnostic medical reagents in Korea.

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Development competence of porcine embryos derived from oocytes selected by brilliant cresyl blue

Jongki Cho*, Pantu Kumar Roy, Xun Fang, Bahia MS Hassan, Sangtae Shin

College of Veterinary Medicine, Chungnam National University

Introduction: The objective of this study was to investigate the effects of staining of porcine cumulus-oocytes complexes (COCs) by brilliant cresyl blue (BCB) test prior to *in vitro* maturation may be used to select developmentally competent oocytes. Furthermore, milrinone can be used to promote developmental competence of porcine embryos produced during parthenogenesis (PA) and somatic cell nuclear transfer (SCNT).

Materials and Methods: Slaughterhouse-derived porcine cumulus-oocyte-complexes (COCs) were exposed to BCB and treated

oocytes divided into BCB+ (colored cytoplasm), BCB- (colorless cytoplasm) groups. After division into 2 groups, intracellular glutathione (GSH) and reactive oxygen species (ROS) of matured oocytes were compared. And, preimplantation development of PA and SCNT embryos were also compared between 2 groups. BCB- oocytes were exposed to milrinone with different concentrations (0, 50, 75, and 100 μ M) for 6 h prior to IVM for further development of embryos.

Results: GSH was higher in BCB+ group than BCB- group whereas ROS was lower in BCB+ than BCB- group. In parthenogenetic embryos, BCB+ oocytes group was significantly higher on maturation (87.5 vs 80.6, 71.3%), cleavage (88.6 vs 82.9, 76.3%), and blastocyst formation rates (34.3 vs 27.8, 25.3%) than control and BCB- oocytes groups, respectively. Moreover, ratio of ICM:TE cells were higher in BCB+ oocytes group (30.3% vs. 28.6, 26.4%, respectively) than other groups. In cloned embryos, the significant higher blastocyst formation rates were shown BCB+ groups (30.6% vs. 26.0, 20.1%) than BCB- groups. To improve the cytoplasmic maturation in BCB- oocytes, 4 different concentrations of milrinone (0, 50, 75, and 100 μ M) were supplemented in the IVM media for 6 h. BCB- oocytes supplemented with 75 μ M milrinone showed the significantly higher rates of blastocyst formation than other groups.

Conclusions: Our results demonstrate that staining of porcine oocytes with BCB before IVM may be used for selection of good quality oocytes and milrinone supplementation can be used to improve embryo developmental competence of porcine embryos.

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Review of the current situation and further perspectives of market for veterinary medical devices in Korea

Jin San Moon*, Kyoung Mook Kang, Tae Young Suh, Myoung Heon Lee

Veterinary Pharmaceutical Management Division, Animal and Plant Quarantine Agency

Introduction: The use of medical devices has been currently increasing in the veterinary medicine in Korea. However, the information on registration of items and status of market of veterinary medical devices has limited all over the world. Therefore, this study reviewed the current situation and further perspectives of the registration and sales of veterinary medical devices in Korea.

Materials and Methods: In this study, we investigated and analyzed on number of products of veterinary medical devices registration by Animal and Plant Quarantine Agency (APQA) by 2016. In addition, we investigated the sales of instruments, supplies, *in vitro* diagnostic reagents,