osteoporosis in experimentalautoimmune encephalomyelitis (EAE), an animal model of multiple sclerosis.

Materials and Methods: After EAE induction, subsequent intra-peritonealinjection (50 mg/kg for 23 days), the spinal cords and tibiae were assessedusing micro-computed tomography (micro CT) and histopathological analysis. Blood samples were taken for biochemical analyses at the end of the experiment.

Results: Lithium treatment significantly reduced the clinicalseverity of EAE, inflammation and demyelination of spinal cords and bonemineral density, cortical geometric structural properties and trabecularmicrostructural properties of the tibial metaphysis compared withadministration of the vehicle alone ($p<0.01$). Gla-osteocalcin analysesshowed that serum levels were increased significantly after lithium treatmentcompared with levels in vehicle mice ($p < 0.05$). Blood biochemistryincluding alkaline phosphatase (ALP), inorganic phosphorus (IP) and calcium(Ca) was changed insignificantly in each group.

Conclusions: Inconclusion, these results showed the efficacy of lithium for paralysis inducedbone loss by viable osteocytes and porosity in EAE.

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O-016

Histological and lectin histochemical studies of the olfactory mucosae and vomeronasal organ of horse

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Introduction: Olfaction in mammals is a primary sense for social interaction and reproductive behavior[1] and is processed by the main and accessory olfactory systems. In the main olfactory system, olfactory receptor cells in the olfactory mucosa receive conventional odors and project olfactory nerves to the main olfactory bulb (OB). Furthermore, the vomeronasal system, a distinct pathway to OB, senses pheromones through receptor cells in the vomeronasal organ (VNO), which sends signals to the accessory olfactory bulb[2]. In the present study, we examined the morphological features of olfactory mucosa and VNO in the horse and characterized carbohydrate sugar residues using lectin histochemistry.

Materials and Methods: Three adult male horses (2-4 years old) were obtained from the Korea Horse Race Association and local abattoir. Formalin-fixed VNOs and ethmoturbinates were trimmed and decalcified in a sodium citrate-formic acid solution with several changes, until the bony pieces softened. After dehydration, the samples embedded in paraffin and sectioned into 5 μm slices. The sections were stained with hematoxylin-eosin and lectin histochemistry was performed using lectin screening kits (Biotinylated lectin kit I, II and III).

Results: Lectin histochemical studies using 21 biotinylated lectins showed that the free border of the vomeronasal sensory epithelium was positive for 20 lectins. In the vomeronasal non-sensory epithelium, the free border was positive for 19 lectins. The cilated cells were positive for 17 lectins and the basal cells were positive for 15 lectins. Eighteen lectins stained the acinar cells of the vomeronasal glands with various binding patterns. Also, the olfactory mucosa showed the various levels of lectin histochemistry.

Conclusions: These findings suggest that horse VNO receptor cells express vomeronasal receptor type 1, and the VNO glands have mucous to seromucous characteristics. Moreover, each lectin differentially binds each cell type in the VNO sensory, non-sensory epithelia, and olfactory epithelium.

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병 리

O-017

Metastatic ceruminous gland adenocarcinoma in a dog

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Introduction: The incidence rate of ear canal tumors is low in dogs [1]. Among them, ceruminous gland carcinomas are relatively common [2]. These tumors tend to be slightly more prevalent in older dogs [3]. Cocker spaniel is at increased risk in dogs [2]. These tumors tend to be infiltrative, erosive, or ulcerated growths. Therefore, secondary infection is common [2]. In other words, these tumors had almost invariable association with inflammation [3].These tumors are infiltrative but rarely invade or destroy the cartilage of the ear canal, and have potential to invasion within the dermis, lymphatics, and adjacent parotid lymph node or salivary gland [2]. The purpose of this report is

to describe morphologic, microscopic and immunohistochemical characteristics of ceruminous adenocarcinoma in a dog.

Materials and Methods: A 13-year-old spayed female, American cocker spaniel dog was submitted to a local animal hospital. Because of ear problem, medical treatment for otitis externa had been carried out for several months, but clinical signs did not improved. According to history taking, the dog showed one month history of the swelling of left ear with ulcerated grape-shaped mass in ear canal. This dog had a mass from left external ear canal and enlarged parotid lymph node. Surgically excised mass and lymph node were referred to Pathology Department of Veterinary Medicine, Jeju National University. The submitted mass was fixed in 10% buffered formalin, trimmed, embedded in paraffin wax, sectioned at 3㎛, and stained with hematoxylin & eosin staining. Perl's iron stain was also performed to determine the origin of this tumor. In addition, to clarify the origin of the neoplasitc cells, immunohistochemical staining was performed with the antibody against for the cytokeratin (CK) 5/6 and CK 7.

Results: Histologically,endophytic neoplastic mass was partially covered with proliferated squamous epithelium. There were numerous proliferated glands in the mass. The neoplastic glands showed very irregular size and shape, and moderate to severe dilation with/without mild papillary growth of luminal epithelium. The neoplastic glands were lined with single to double cell layers of epithelium. The lining epithelium showed variable shape from flatten to tall columnar, and had pleomorphic nuclei with prominent nucleoli with scant eosinophilic cytoplasm. Occasionally mitotic figures were observed in lower part of glandular epithelium. These neoplastic cells showed strong invasive tendency to adjacent tissues including cartilage. Many neoplastic glands contained eosinophilic protein fluids and small number of degenerated cellular debris. Severe multifocal necrotic foci also scattered throughout the mass. Massive metastatic foci of glandular structures originated from ceruminous gland were presented in the enlarged parotid lymph node. Immunohistochemically, the neoplastic cells showed positive reactions for CK 7, but negative reactions for CK 5/6.

Conclusions: Based on histopathologic and immunohistochemical features, this case was diagnosed as metastatic ceruminous gland adenocarcinoma in a dog. To our best knowledge, this is the first report of metastatic ceruminous adenocarcinoma with emphasis on histopathologic features in Korea.

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O-018

Expression of CD163 and macrophage related cytokines in canine mammary gland carcinomas are associated with obesity

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Introduction: Obesity is significant risk factor for human breast cancer and canine mammary tumor (CMT) development. Tumor-associated macrophages(TAMs) are an important component of leukocyte infiltration in tumors, and their levels are high in obese animals. TAMs can be classified into M1 and M2 phenotypes. M2 phenotype marcophage generate high levels of anti-inflammatory cytokines and promote tumor progression by angiogenesis. So objective of this study is to analyze M2 phenotype by CD163 antigen which is M2 phenotype membrane receptor, and representative cytokines of M2 phenotype near the TAM in CMCs and to identify relationships between TAM polarization and obesity in the basis of the body condition score(BCS).

Materials and Methods: Fifty tissue specimens(26 tissues were obesity, 24 tissues were normal) were randomly selected from CMT that had been diagnosed histopathologically by the Department of Veterinary Pathology, Konkuk University Animal Teaching hospital, Seoul, Korea, from 2012 to 2015. The cases were divided into 2 groups on basis of their BCS: group A, BCS= 2 or 3(lean or optimal body weight), and group B, BCS = 4 or 5 (overweight or obese). Immunohistochemistry (IHC) was used to identify macrophage, CD163, IL-6, IL-10 and TGF-β with primary antibody. First of all, two serial 4 μm tissue sections were used for Myeloid/Histiocyte staining (1st section) and CD163 staining (2nd section). Then four serial 4 μm tissue sections were used for IL-6 staining (1st section), Myeloid/Histiocyte staining (2st section), IL-10 staining(3rd section) and TGF-β staining (4th section). Four areas of the 2nd section which show the most macrophage density, so called 'hotspot' were acquired at X400 magnification, and each equal fields of 1st, 3rd and 4th section were acquired at x400 magnification. To evaluate protein expression and assess immunoreactivity in serial sections and reduce person's subjectivity, computer-assisted image analysis software was used

Results: CD163 was expressed in TAMs and cancer cells. On the basis of BCS, the expression of CD163 was significantly higher in overweight or obese dogs than that in lean or normal dogs ($P = 0.006$). In contrast, the expression of IL-6 was significantly higher in lean or normal dogs than that in overweight or obese dogs ($P = 0.000$).

Conclusions: CD163 expression is related to M2 phenotype macrophages, which promote tumor progression, while IL-6