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ctical anatomy of the dog. Multimedia CD-ROM. P. SÓTONYI*, Dept. of Anat. and Histol., Szt. István ., Budapest, Hungary.

o far teachers and students have been able to find the adequate anatomical knowledge in books and anatomical ases. However, colleagues in the everyday praxis find it difficult to get the information they need directly from iese sources, and understanding the point of the matter takes a lot of time. For practical reasons it seemed reasonable to create an easy-to-use multimedia CD-ROM, in which we presented all the details of the canine body and from which the veterinarian could easily and quickly extract the information needed for everyday practice. So far, there has not been any approach like this. From the point of view of clinical practice (way of the dissection, orientation on the pictures) the format of the CD-ROM makes it possible to study the anatomical topic needed at the moment. The CDs contain digitalized video fragments accompanied by sound recording and approximately 200 images with detailed labels displaying anatomical information about the anatomical dissection of the dog. The moving scenes, which can be stopped at any moment, are enlargeable and the most important structures are labelled in detail. In order to make the dissection and all the anatomical structures clear, pictures and videos are explained thoroughly by voice recordings. An option enables the user to view the list of anatomical terms associated with a given area. All the anatomical names are given in up-to-date medical English. Theoretically the images and voice preserve their quality for an unlimited time. Due to the newest techniques the quality of the digital recording reaches the resolution of the VHS video tape and on the monitor display all the scenes are perfectly detailed. A further advantage is the digital format: fast search engine according to the topics, entry-words, pausing, and image enlarging are all comfortable services that cannot be beaten by any traditional techniques or by text-books. (E-mail of the corresponding author: psotonyi@univet.hu)

Comparative anatomy of the canine and equine middle and inner ear. P. SÓTONYI[1], M. TÓTH[2], Ö. PETNEHÁZY[1]*, [1]Dept. of Anat. and Histol., Szt. István Univ., Budapest, Hungary, [2]Appl. and Clinic. Lab., I, Inst. of Anat. and Embryol, Semmelweis Univ., Budapest, Hungary.

The main purpose of our study was the comparative presentation of the equine and canine middle and inner ear. The main interest was aimed at the endoscopic anatomy of the bony structure of these organs. The macroscopic structures of the middle and inner ear of 6 horses and 8 dogs of different ages were examined, photographed and described. In order to get the best results first we put the optics in the external acoustic meatus and examined the intact structures of the middle ear. Henceforth we used a dental burr to remove step by step the osseous bulla to present the auditory ossicles, their junctions and relations to their surroundings. After a complete bullectomy the tympanic cavity was examined to describe the physiologic position of the ossicles and the lateral wall of the petrous bone. The inner ear was opened and sawed in the axis of the cochlea in order to measure the windings of the organ and show its details. The osseus channels are also present in opened status in order to examine their curves and exact angles. To specify the correct shape of the organs in the inner ear, 2 bones from each species were filled with dental silicone and methyl-metacrylat and put in dipping liquid. In this way the organs situated in the inner ear of these two species can be easily compared. (E-mail of the corresponding author: opetne5@hotmail.com)

Cyclic changes of the estrogen receptor alpha in the porcine uterus and vagina. S. SPAHN, M. STEFFL, W.M. AMSELGRUBER*, Dept. Anat. Physiol. Dom. Anim., Univ. Hohenheim, Stuttgart, Germany.

Estrogen receptor-α (ER-α), one of two ER-isoforms, is a ligand-dependent transcriptional activator, which regulates gene expression via complex mechanisms. Estradiol-17-β acts by stimulating cell proliferation and is obligatory for uterine epithelial morphogenesis, cytodifferentiation and secretory activity. For the first time we could demonstrate the expression of ER-α in porcine uterus, cervix and vagina throughout the estrous cycle by immunohistochemistry using a specific murine monoclonal anti-human ER-α-antibody. In the vagina as well as in the different uterine compartments like cranial and caudal cervical section, uterine horn and the top of the uterine horn we detected a cycle-dependent specific ER-α-expression pattern. For semiquantitative evaluation we applied a modified method of Remmele and Stegner (1987). Throughout the cycle a similar ER-α-expression pattern of luminal and glandular epithelium in the porcine uterine horn and top of uterine horn was detected. The expression decreased from estrous continuously reaching a minimum on day 5 of the cycle. In the cervical compartments a similar ER-α-immunoreactivity was observed. Additionally, we demonstrated an opposite ER-α-expression pattern in luminal epithelium and peripheral glandular epithelium. In the vagina the immunoreactivity of luminal and glandular epithelium differed significantly from that in uterus and cervix. Moreover stromal-specific expression of the ER-α varied from that of the luminal epithelium within the reproductive tract and a particular interesting expression was observed in the myometrial smooth muscle cells with a clear peak on day 18. The different topographical expression pattern suggests to us a connection to implantation and onset of labour. (E-mail of the corresponding author: amselgru@uni-hohenheim.de)

Expression and distribution of Pacap m-RNA in the duck gastrointestinal tract. C. SQUILLACIOTI[1]*, N. MIRABELLA[1], M. COLITTI[2], V. ESPOSITO[1], G. PAINO[1], [1]Department of Structures, Functions and Biological Technologies, University of Naples 'Federico' II, Naples, Italy, [2]Department of Sciences of Animal Production, University of Udine, Udine, Italy.

PACAP is a peptide belonging to the vasoactive intestinal peptide (VIP)/secretin/glucagon superfamily. It was first isolated from the ovine hypothalamus and found to be present as two forms of 27 (PACAP27) and 38 aminoacid

ACAP38) residues. PACAP is present in the central nervous system and in peripheral organs. PACAP functions as a hypothalamic hormone, neurotransmitter, neuromodulator and neurotrophic factor. The PACAP gene of mammals is composed of five exons, the sequence of PACAP is encoded by exon 5. The chicken PACAP gene is composed of five exons and encoded also GRF (Growth hormone-Releasing Factor). The chicken gene encoding both GRF and PACAP is called GRF/PACAP gene. In the present study, the duck GRF/PACAP cDNA was characterized using RT-PCR. The cDNA which was amplified and sequenced (AF343119) from the duck hypothalamus was highly homologous to that in the chicken (U67275). In particular, the PACAP partial cds (coding sequence) in the duck is highly homologous (98%) between 3967-4149 nucleotides (nt) of the exon 5 that encodes for a part of the chicken GRF and the entire PACAP (88-270 nt in the duck), and between 3508-3596 nt (92%) of the exon 4 that encodes for the chicken cryptic peptide and GRF (1-88 nt in the duck). PACAP mRNA was expressed in the all tracts of the gastrointestinal canal. In situ hybridization (ISH) revealed PACAP mRNA in myenteric and submucosal ganglion cells. In the proventriculus, PACAP mRNA was also found in mucosal ganglia. In the deep proventricular glands and jejunal villi several ISH-positive cells were observed within epithelium. In addition, in the mucosa associated lymphoid aggregates numerous and intensely labeled positive cells were found. In conclusion, the results of the present study showed that PACAP is expressed in neuronal and non-neuronal tissues of the duck gastrointestinal tract and may play multiple roles in the regulation of avian gastrointestinal functions. (E-mail of the corresponding author: caterina.squillacioti@tin.it)

On the innervation of the stifle-joint capsule in the dog. C. STASZYK*, H. GASSE, Dept. of Anatomy, School of Veterinary Medicine Hannover, Hannover, Germany.

A general pattern of joint capsule-innervation is a multiple and segmental supply with direct articular branches from the limb nerves. This innervation is completed by indirect nerve fibres that come out of the periosteum and out of the surrounding muscles. Articular branches are usually short, because they are released in close vicinity to the target region of the joint. In terms of this, the cranial aspect of the stifle joint is quite distinct, because no limb nerves pass along this region. *Rami articulares* are, therefore, relatively long. Further, they have to perforate very substantial fibrous layers of fasciae and tendons before they reach the joint capsule's surface. Special attention is also due to the different degree of extracapsular and intracapsular ramification of these branches and their further course in the joint capsule's wall. Focussing on a functional significance and surgical relevance, this study is supposed to: 1. demonstrate macroscopically the nerves in the vicinity of the stifle joint and to identify articular branches given off by the respective nerves; 2. visualise the further ramification, course and extension of articular branches in order to determine the innervation of distinct segments; visualisation is achieved in cleared specimens after staining for acetylcholinesterase (AChE) according to Baljet and Drukker (1975). Macroscopically, the cranial aspect of the joint capsule is found to be supplied by *N. femoralis*, *N. saphenus* and *N. obturatorius*. Their articular branches run between the quadriceps muscle or subfascially on the medial side of the hind limb to reach the joint capsule at its proximomedial aspect. The *N. fibularis* communis and *N. tibialis* release branches to the flexor side of the stifle joint as they pass close to the joint capsule's surface. As seen in the specimens stained for AChE, intracapsular nerve fibres in the cranial joint capsule aspect (direct ones originating from *Rami articulares* as well as indirect ones from *Rami musculares*) are lined up mainly parallel to the collagen fibres of the *Lig. patellae*. In contrast, the intracapsular *Rami articulares* in the loose joint capsule of the flexor side tend to display a stellate ramification pattern. (E-mail of the corresponding author: carsten.staszyk@tiho-hannover.de)

Co-expression of chromogranin A and inositol 1,4,5-trisphosphate receptor in the bovine oviduct. M. STEFFL*, M. SCHWEIGER, W.M. AMSELGRUBER, Dept. Anat. Physiol. Dom. Anim., Univ. Hohenheim, Stuttgart, Germany.

Chromogranin A (CgA) belongs to the family of acidic and hydrophilic secretory glycoproteins that are expressed in almost all endocrine and neuroendocrine cells. The protein binds and stores Ca^{2+} ions with high-capacity and low-affinity and interacts directly with the inositol 1,4,5 trisphosphate receptor (IP_3-R), which functions as a Ca^{2+} release channel. The IP_3-R type2 is located predominantly in the liver, but also in brain, heart, lung and testes. More recently, IP_3 receptors were identified in oviductal epithelial cells of the mouse. In this study we supposed therefore, that CgA and IP3-R type 2 could be co-expressed in the mammalian oviduct and furthermore, that both proteins could be involved in the regulating of the Ca^{2+}-dependent ciliary activity. We have analyzed therefore the expression of CgA and IP_3-R type 2 in bovine oviductal paraffin sections of ampullary segments at different stages of the oestrous cycle by immunohistochemistry. The results of our study clearly demonstrate that (1) CgA and IP_3-R type2 are co-expressed and show an identical cellular localization in ciliated cells of the bovine oviduct. Both antigens are predominantly concentrated in the apical membrane periphery in close vicinity to the ciliary apparatus. Secretory cells and intraepithelial neuroendocrine cells are uniformly not stained with both antibodies. (2) The number of CgA-positive ciliated cells increases during the luteal phase, reaches a maximum at prooestrous and than decreases at oestrous. These results indicate for the first time that the coupling of the IP_3-R with the Ca^{2+} storage protein CgA may exist not only in neuroendocrine tissues but also in epithelial ciliated cells of the bovine oviduct. Our present findings give first evidence that CgA and IP_3-R type2 could be involved in the intracellular accumulation of Ca^{2+} at the ciliary apparatus. (E-mail of the corresponding author: stefflma@uni-hohenheim.de)