

## Резюмета на трудовете след предходна хабилитация

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**Приложение 8.2. Б.4. Хабилитационен труд - научни публикации (не по-малко от 10) в издания, които са реферирани и индексирани в световноизвестни бази данни с научна информация (Приложение 8.2).**

1. P. Yonkova, P. Atanassova, A. Vodenicharov, **R. Dimitrov**, P. Hrishev, 2011. Enzyme histochemical expression of lipoprotein lipase in the liver and adrenal glands in clinically healthy rabbits. Bulgarian Journal of Veterinary Medicine, 14, (3): 137-141. Scopus. SJR-0.211.

The liver enzyme lipoprotein lipase (LPL) facilitates the release of cholesterol from lipoproteins and plays a key role in the synthesis of steroid hormones in the adrenal glands. For the current study, 6 male and 6 female clinically healthy New Zealand White rabbits, aged 3.5 months were used. Enzyme histochemical reaction (per Gomori) was performed on fresh cryostat sections, and through the Tween method, a strong positive expression of LPL in the sinusoid capillaries of the liver lobules, the lumen, and the smooth muscle cells of the walls of interlobular arteries and veins was shown. A moderate LPL expression in zona glomerulosa and weak expression in zona fasciculata were observed in the adrenal glands, whereas no LPL expression was found in both the cortical zona reticularis and the adrenal medulla.

2. **R. Dimitrov**, T. Chaprazov, 2012. An anatomic and contrast enhanced radiographic investigation of the rabbit kidneys, ureters and urinary bladder. Revue de Médecine Vétérinaire, 163, (10): 469-474. IF- 0.22.

Aim: To perform anatomical assessment of the X-ray data of the normal urinary tract of the rabbit in order to give references when interpreting images of the kidney lesions in this species. Materials: We investigated 9 sexually mature white New Zealand rabbits, aged 12 months, weighed from 3.0 kg to 3.4 kg. Methods: Excretory urography. The animals were sedated with (IM) 15 mg/kg Zoletil® 50. The study was done with stationary X-ray apparatus TUR 800 D-1, set with digital apparatus - iQ-CR ACE. Left and right and ventrodorsal abdominal radiographies were taken subsequently every 5 min after the rapid delivery of a non-ionic contrast agent. Results: The right kidney was localized between the cross-section of the 13<sup>th</sup> thoracic vertebrae and second lumbar, and the left from the second to the fourth lumbar vertebrae. The kidneys were visualized as dense soft tissue and show distinct borders compare to the structures. Conclusion: The urogram corresponded to the nephrographic, pyelographic, ureterographic and cystographic phase of excretion of contrast dye. The excretory urography is a good suitable method for anatomical imaging of the kidneys, ureters and bladder in the rabbit.

**3. R. Dimitrov**, P. Yonkova, K. Stamatova, D. Yovchev, 2012. Ultrasonographic features of the bulbourethral glands in the domestic rabbit (*Oryctolagus cuniculus*). *Veterinarski Arhiv*, 82, (2): 193-200. SJR-0.193.

The aim of the study was to describe some of the ultrasonographic features of domestic rabbit bulbourethral glands, with regard to their relevance to reproductive pathology. The glands of ten sexually mature, clinically healthy, white, male New Zealand rabbits, aged 18 months, with body masses ranging from 2.8-3.2 kg, were investigated following anaesthesia. A perineal sonographic approach was applied. The glands were observed in two planes. They were viewed sonographically as solid, hyperechoic, heterogeneous structures. A hyperechoic gland without a hypoechoic center was visualized in sagittal section. In transverse section, normal bulbourethral glands were visualized dorsolaterally to the bulbar urethra, and a hypoechoic urethra was located ventromedially. As part of the study, the sonographic features of the bulbourethral glands were compared in a liquid isotonic medium. The analogous results of both methods allowed us to propose the use of perineal ultrasonography as a sufficiently definitive, non-invasive method for visualizing rabbit bulbourethral glands.

**4. K. Stamatova-Yovcheva, R. Dimitrov**, A. Russenov, 2012. Some imaging anatomical ultrasonographic features of the liver in domestic rabbit (*Oryctolagus cuniculus*). *Bulgarian Journal of Agricultural Science*, 18, (1): 144-146. SGR-0.216.

We studied nine sexually matured, healthy New Zealand white rabbits. The animals were positioned in supine recumbence. The sonographic approach was transabdominal percutaneous hypochondrial. The liver of four investigated animals was extirpated, following euthanasia and studied in liquid isotonic medium, in order to compare its ultrasonographic characters with these of its normal topography. The rabbit liver was an echoic structure with regular contours, close to the hyperechoic diaphragm. The liver parenchyma showed heterogeneous echogenicity. The gall bladder was observed as a longitudinal oval finding, filled with anechoic content, and its wall was hypoechoic.

**5. R. Mihaylov, R. Dimitrov**, E. Raichev, D. Kostov, K. Stamatova-Yovcheva, D. Zlatanova, B. Bivolarski, 2013. Morphometrical features of the head skeleton in Brown Bear (*Ursus Arctos*) in Bulgaria. *Bulgarian Journal of Agricultural Science*, 19, (2): 331-337. SJR 0.162.

Fifteen craniometrical indices of the head skeletons in forty brown bears (*Ursus arctos*) found in Bulgaria were studied. Data for the greatest length of the head skeleton and condylobasal length as well as the results of those motivated us to propose that the greatest length of the head skeleton in Bulgarian population of brown bears is from 280 mm to 350 mm, and the condylobasal length is from 276 mm to 304mm. Our results for length skull (cranium) and face

showed that face length were 35.33% of head skeleton length. The length, rostral and caudal width of the bone palate demonstrated that the palate widened in caudal direction. the basal length of the skull was with close value to bone palate length and it could be accepted that the caudal edge of the bone palate was approximately in the middle of the ventral surface of head skeleton. the zygomatic width of the specimens was 59% from the greatest length of the head skeleton.

**6. R. Dimitrov, K. Stamatova, D. Kostov, 2013. Comparative imaging of the vesicular glands in New Zealand white rabbits (*Oryctolagus cuniculus*). Turk. J. Vet. Anim. Sci., 37: 97-101. IF- 0.316.**

This study investigated the morphological topographic features of the vesicular glands (gll. vesiculosae) in 10 sexually mature and clinically healthy male New Zealand White rabbits, aged 12 months, with body weights from 2.8 kg to 3.2 kg. The glands were observed by ultrasonography in 2 planes, transversal and sagittal. The approach was percutaneous transabdominal prepubic. The rabbit vesicular glands were visualized as a solid heterogeneous echogenic finding. Using computed tomography, we scanned the pelvis in the transversal plane through the first sacral vertebra, at a cut thickness of 3 mm. The vesicular glands were visualized as transversally ovoid, homogeneous, and hyperdense soft tissue structures. Our observations on ex vivo frozen sagittal and transversal cuts of the pelvis showed analogous morphological and anatomic characteristics to those obtained by ultrasonography and computed tomography. The imaging features of normal domestic rabbit vesicular glands can be used as a morphological basis for the interpretation of some glandular lesions.

**7. P. Yonkova, A. Rusenov, D. Kanakov, D. Zapryanova, E. Vachkova, Ayşe Serbest, R. Dimitrov, D. Kostov, 2012. Ultrasound imaging, biochemical blood analyses, and weight investigations of dissectible fat depots in New Zealand white rabbits. Turk. J. Vet. Anim. Sci., 36, (1): 635-641. IF- 0.22.**

The purpose of the present study was to evaluate changes in real-time ultrasound imaging traits and weight of dissectible fat depots (inguinal, interscapular, and perirenal) in rabbits with different body weights and to monitor the changes in blood glucose and constituents of lipid profiles. In this study, 18 clinically healthy male New Zealand white rabbits were used. The rabbits were fed with standard diet and were divided into 3 groups according to their body weight: group 1 at  $1.06 \pm 0.03$  kg, group 2 at  $2.1 \pm 0.05$  kg, and group 3 at  $3.06 \pm 0.03$  kg. Examined by ultrasonography, the inguinal and interscapular fat depots appeared as bands with weak to moderate echogenicity, whereas perirenal fat was moderate to hyperechoic. The thickness of subcutaneous fat depots measured by ultrasound increased along with body weight

and differences between the groups were found to be statistically significant ( $P < 0.001$ ). The differences in perirenal fat thickness between rabbits from group 1 and group 2 were not found to be statistically significant. Perirenal fat thickness in the rabbits from group 3 was higher ( $P < 0.001$ ) than that of the other groups. Perirenal fat weight in group 3 correlated positively ( $r = 0.82$ ;  $P < 0.05$ ) to body weight. Blood biochemical analysis showed that blood glucose, total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) were in the reference range for all groups regardless of the fact that TG and HDL-C in groups 2 and 3 were significantly higher than those in rabbits from group 1. The in vivo ultrasound screening of adipose tissue, together with blood lipid profile, is an indicator of good health and proper energy balance in rabbits bred for meat or as companion animals.

**8. R. Dimitrov**, D. Vladova, K. Stamatova, D. Kostov, M. Stefanov, 2012. Anatomical computed tomographic study of the heart and some mediastinal vessels of the rabbit (*Oryctolagus cuniculus*). Bulgarian Journal of Agricultural Science, 18, (5): 784-788, SGR-0.216.

The aim of the study is to utilize the computed tomography the anatomical study of the rabbit heart and some of its mediastinal vessels. We investigated seven sexually mature, healthy male white New Zealand rabbits, aged 12 months. The animals were anesthetized. The bodies of the thoracic vertebrae were used as bone markers when performing the imaging. At the level of the third and fourth thoracic segment were found only vascular structures. At the fifth thoracic vertebrae a partial heart silhouette was observed, and the complete one – at the seventh. At the third, fourth and fifth thoracic vertebrae an image of the ascending aorta was found, at the third and fourth one – aortic arch, at the fifth segment – the beginning of the descending aorta. The results confirm the thesis, that the rabbit is a suitable biological model for morphological and functional studies of the heart.

**9. R. Dimitrov**, 2013. Anatomical imaging analysis of the prostate gland in rabbit (*Oryctolagus cuniculus*) - Helical computed tomography study. Revue de Médecine Vétérinaire, 164, (5): 245-251. IF- 0.25.

The aim of the study was to analyze the anatomical image of the normal rabbit prostate complex (gland) by the utilization of helical computed tomography (CT) method. Ten male mature New Zealand white rabbits with a weight between 2.8 kg to 3.2 kg were used. The animals were anesthetized. The contrast medias were applied intravenously and orally. The helical CT imaging was done according to the following bone markers: acetabular part of the pelvic bone (lateral), the pectineal line of the pubis (ventral), first and second sacral vertebrae (dorsal). The cranial

part of the prostate complex (proprstate part and the front segment of the prostate parts) is oval and dorsoventral flattened. Te glandular tissue was a relatively hyperdense, heterogeneous structure that showed soft tissue density characteristic. Ventromedially, the prostate urethra was visualized, the lumen of which was hypodense and the wall relatively hyperdense with sof tissue characteristic. The image of the caudal part of the prostate complex (the caudal segment of prostate part and paraprostate parts) showed heterogeneity and hyperdensity. The rectal lumen showed contrast image. Te helical computed tomographic investigation of the prostate complex in rabbit is a highly definitive method for imaging of the anatomical specificities of the gland. The results of the present study could serve as good investigational base for imaging anatomical and diagnostic examination of the prostate in small domestic mammals. The branches of prostatic artery showed contrasted image and was observed laterally. Teir arrangement is very important from clinical and surgical point of view.

**10.** K. Stamatova Yovcheva, **R. Dimitrov**, Y. Toneva, P. Yonkova, D. Kostov, A. Rusenov, K. Uzunova, V. Yordanova, 2013. Helical computed tomography application in rabbit liver anatomy: comparison with frozen cross-sectional cuts. Turk. J. Vet. Anim. Sci., 37: 553-558. IF 0.221.

Our focus has been to study and compare the anatomical helical computed tomography (CT) features of the normal rabbit liver with its native cross-sectional anatomy. Helical CT was used for scanning the cranial part of the abdominal cavity. The slice thickness was 5 mm. Frozen transversal anatomic cross-sections with a thickness of 10 mm were obtained from the cranial abdominal part of 4 animals following euthanasia. They were compared with the corresponding helical CT scans. At T9 (thoracic vertebra), the helical CT images showed in the whole aspect a normal liver. It was a massive, heterogeneous, sof tissue, with normal attenuating findings and distinguished edges. The gallbladder was hypoattenuated compared to the liver parenchyma. At the level of T11 the liver was in sharp distinction to the fundus and body of the stomach. At T12 the rabbit liver was found in close contact with the stomach, duodenum, and ascending colon. Only the right hepatic lobe was visible at the level of T13, outlined by the right kidney impression. The right hepatic and caudate lobe were observed at L1 (lumbar vertebra). The frozen cross-sections have analogues to the corresponding helical CT images. Tath motivated us to conclude that helical CT is an accurate mode for studying the rabbit liver anatomy.

**Приложение 8.2. Г.6. Публикувана книга на базата на защитен дисертационен труд за присъждане на образователна и научна степен "доктор" или за присъждане на научна степен "доктор на науките".**

**1. Росен Димитров, 2022.** Морфофункционални особености и образноанатомични характеристики на допълнителните полови жлези и тазовата част на уретрата при котарака. Издателство КОТА, Стара Загора. ISBN: 978-954-305-605-7.

**Приложение 8.2. Г.7. Статии и доклади, публикувани в научни издания, реферирани и индексирани в световноизвестни бази данни с научна информация.**

**1. R. Dimitrov, 2013.** Ultrasonographic features of prostate gland in the domestic rabbit (*Oryctolagus cuniculus*). Bulgarian Journal of Agricultural Science, 19, (1): 169-172. SJR: 0.27.

The prostate gland of ten sexually mature, healthy male white New Zealand rabbits at the age of 12 months, weighing 2.8 - 3.0 kg, was studied by ultrasonography. Following anesthesia, the urinary bladder was filled with physiological saline. The three glandular parts were observed only on the sagittal ultrasonographic plane. The proprostate and paraprostate parts were visualized as a solid, homogenous structure with a relatively higher echogenicity, as compared with the more caudally situated prostate part. On the transversal ultrasonographic plane, the whole prostate gland was seen as a solid, ovoid, heterogeneous and entirely hyperechoic structure. The sagittal and transversal ultrasonographic images of the postmortally extirpated prostate glands immersed in an isotonic liquid medium corresponded completely to the glandular findings observed in vivo. The results of our investigations motivated us to propose the use of the prepubic ultrasonography, with a filled urinary bladder, as a useful method for visualization of the rabbit prostate gland.

**2. R. Dimitrov, 2012.** Ultrasound features of kidneys in the rabbit (*Oryctolagus cuniculus*). Veterinary World, 5, (5): 274-278. Scopus SJR-0.275.

Purpose: To determine the normal sonographic features of rabbit kidneys with regard to their use in diagnostic imaging of renal lesions in this species. Materials: Twelve sexually mature clinically healthy New Zealand White rabbits weighing 2.8 kg to 3.2 kg were examined after anaesthesia. Methods: A diagnostic ultrasound system with microconvex multifrequency 6.5 MHz probe was used. The animals were positioned in dorsal recumbency. The transabdominal paravertebral imaging approach was used. Longitudinal and transverse scans of the kidneys were obtained. Six rabbits were sacrificed, their kidneys removed and studied in isotonic liquid medium. Results: The shape of kidneys was elliptical. The fibrous capsule was visualized as a straight hyperechoic band. The fatty capsule was hyperechoic and with irregular borders. The cortex exhibited a heterogeneous echogenicity. The acoustic density of the cortex was lower than that of the liver. The echogenicity of the medulla was lower as compared to the cortex and the structures of the kidney pelvis. The latter appeared as a centrally located

hyperechoic structure. The post mortem examination showed that kidneys were oval and hyperechoic. The kidney pelvis was seen as a centrally located longitudinal finding, and the renal hilum – as a centrally located hyperechoic finding. Conclusions: The transabdominal paravertebral approach was a good method for visualization of rabbit kidneys. The dorsal recumbency of the subjects allowed the visualization. The in vivo results corresponded to those from the post mortem study. The rabbit kidney was oval in shape. The hypoechoic peripheral zone is occupied by the cortex and the medulla, while the hyperechoic central zone – by the kidney pelvis. The cortex was less echoic than the liver parenchyma. The kidney pelvic cavity had a lower acoustic density than its walls, due to the presence of peripelvic adipose tissue. The present results could be used in the interpretation of normal and pathological renal findings in the rabbit.

**3. R. Dimitrov, K., Stamatova, A. Russenov, D. Kostov, D. Vladova, M. Stefanov. 2012.** Ultrasonographic qualitative characters of rabbit spleen (*Oryctolagus cuniculus*). *Trakia Journal of Sciences*, 10, (1): 64-69. Web of Science.

AIM: Finding some qualitative ultrasonographic features of normal rabbit spleen, in order to use the obtained results for imaging anatomical and diagnostic study of human and animal spleen lesions. MATERIALS: We investigated 9 sexually mature, healthy white New Zealand rabbit, aged 8 months, weighed from 2.8 kg to 3.2 kg. The animals were anesthetized. METHODS: The study was performed with Diagnostic Ultrasound System: model DC-6V Shenzhen Mindray Bio-Medical, Electronics CO. Ltd (CHINA). We used 6.5 MHz microconvex and 5 MHz linear probes. The animals were positioned in supine recumbency. The approach was left percutaneous transabdominal hypochondrial left. The spleen of four animals was extirpated, following euthanasia. The obtained preparations were investigated in liquid isotonic medium. RESULTS: In the sagittal ultrasonographic study, the spleen was with elongated oval shape. In the transversal one the organ's shape was triangular. The capsule was visualized as hyperechoic and heterogeneous striped finding. Parenchyma was hypoechoic, compared to the capsular structure. The blood vessels were visualized as oval anechoic findings. The investigation of extirpated spleen post mortem showed, that in sagittal aspect parenchyma is with homogeneous echogenicity. The capsule was relatively more hyperechoic and comparatively more homogeneous structure than parenchyma. CONCLUSIONS: The qualitative ultrasonographic data for the rabbit spleen could be used as biological model in the imaging anatomical and diagnostic studies of some human and animal spleen lesions.

4. K. Stamatova-Yovcheva, **R. Dimitrov**, A. Russenov, 2012. Some imaging anatomical ultrasonographic features of the liver in domestic rabbit (*Oryctolagus cuniculus*). Bulgarian Journal of Agricultural Science, 18 (1): 144-146. SJR-0.216.

We studied nine sexually matured, healthy New Zealand white rabbits. The animals were positioned in supine recumbence. The sonographic approach was transabdominal percutaneous hypochondrial. The liver of four investigated animals was extirpated, following euthanasia and studied in liquid isotonic medium, in order to compare its ultrasonographic characters with these of its normal topography. The rabbit liver was an echoic structure with regular contours, close to the hyperechoic diaphragm. The liver parenchyma showed heterogeneous echogenicity. The gall bladder was observed as a longitudinal oval finding, filled with anechoic content, and its wall was hypoechoic.

5. **R. Dimitrov**, 2012. Comparative ultrasonographic, anatomotopographic and macromorphometric study of the spleen and pancreas in rabbit (*Oryctolagus cuniculus*). Not. Sci. Biol., 4 (3): 14-20. Scopus.

The study aims to perform comparative analysis of the metric anatomy of the spleen and pancreas in rabbit, determined by applying of transabdominal ultrasonography and convectional anatomical research. Twelve mature, clinically healthy New Zealand White rabbits 8 months of age from and weighed between 2.8 kg and 3.2 kg were looked at. The transabdominal B-mode ultrasonography was performed by Diagnostic Ultrasound System. The spleen and pancreas were imaged sagittally and transversally. The approaches were percutaneous transabdominal hypochondrial left and percutaneous transabdominal epigastric. After euthanizing the animals a laparotomy was performed. The topography, shape and morphometry were made. In longitudinal ultrasonographic study of the spleen has been seen its elongated shape. There were ultrasonographic metric data presented. The organ was seized to the greater curvature of the stomach in the area of the bottom and portions of the body of the stomach. The ultrasonography and postmortem study showed that the pancreas in rabbit is disseminated organ. The body of the pancreas was localized in the mesoduodenum of the duodenal sigmoid flexure, immediately behind the porta hepatic, as it has been cut through by the portal vein. From the comparative analysis of the obtained results could be conclude, that the study of some quantitative parameters of the structure of the pancreas in rabbit should contribute to the accurate diagnostics of the pancreatic lesions and the abdominal surgical practice in the animals.

6. K. Stamatova-Yovcheva, **R. Dimitrov**, P. Yonkova, A. Russenov, D. Yovchev, D. Kostov, 2012. Comparative imaging anatomic study of domestic rabbit liver (*Oryctolagus cuniculus*). Trakia Journal of Sciences, 10, (1): 57-63. Web of Science.



**Aim:** Comparing results from rabbit liver's ultrasonographic, computed tomographic and anatomical topographic studies. **Object:** Nine healthy New Zealand white rabbits, aged 8 months, weighed 2.8 to 3.2 kg were studied. In the ultrasonographic investigation the animals were positioned in supine recumbency. The approach was transabdominal percutaneous hypochondrial. The abdominal cavity was transversally and sagittally scanned by axial computer tomograph. The animals were positioned in supine recumbency. In the native anatomical investigation topographic rabbit liver's features were compared with its imaging anatomical findings. **Results:** The liver echogenicity was heterogeneous and lower than the close soft tissue structures. The gall bladder's wall was a hypoechoic finding. Cystic duct was observed in its beginning part. In the computed tomographic study, the liver was a massive, heterogeneous, normodense soft tissue finding. There wasn't visible border between lateral and medial left hepatic lobe and right hepatic lobe. In the native anatomical study the left and right hepatic lobes, quadrate lobe and gall bladder's parts were found. **Conclusion:** The comparative analysis of rabbit liver's imaging anatomical and native transversal study could be applied in the interpretation and diagnosis of many rabbit liver diseases.

**7. R. Dimitrov,** D. Kostov, K. Stamatova, V. Yordanova, 2012. Anatomotopographical and morphological analysis of normal kidneys of rabbit (*Oryctolagus cuniculus*). *Trakia Journal of Sciences*, 10, (2): 79-84. Web of Science.

**AIM:** To determine some qualitative and quantitative characteristics of normal kidneys in rabbits and their use in diagnostics of kidney lesions in animals. **MATERIALS:** We used 12 mature, clinically healthy, euthanized rabbits, 8 months of age from New Zealand White breed and weight between 2.8kg and 3.2kg. **METHODS:** After applied laparotomy we studied the topography and the shape of the kidneys in the rabbits. The results were collected and recorded. There were also macroscopical linear measurements done after the organ's extirpation. The obtained data was processed via variable statistical methods. **RESULTS:** The right kidney was situated in the margins between 13th thoracic and 2nd lumbar vertebrae and the left kidney was between the margins of 3rd and 5th lumbar vertebrae. The lateral edges did not reach the sides of the abdominal walls. The pelvis of the left kidney was larger in length and smaller in width compare to the right organ. The width of the cortex and the medulla of the right kidney were greater than the left one. The width of the hilus of the right kidney was greater than the left. **CONCLUSION:** The right kidney in rabbit is shorter and narrower and the left is longer, wider and dorsoventrally flattened. The right kidney is located craniomedially and dorsally compare to the left. Despite many authors, we used as bone landmarks only the bodies of the thoracic and lumbar vertebrae.

**8. D. Kostov, R. Dimitrov, K. Stamatova-Yovcheva, A. Atanasov, P. Yonkova, D. Vladova, R. Mihaylov, D. Yovchev, 2014. Some heavy metals' concentrations in the metacarpal bones of paleontological cattle from Azmashka Settlement Hill. J. Fac. Vet. Med. Istanbul Univ., 40 (1): 14-19. Scopus.**

The aim of the present study was to investigate and determine concentrations of some heavy metals in the cattle metacarpal bones, found from Azmashka settlement hill. They belonged to four periods: Early Neolith (EN), Early Halkolith (EH), Late Halkolith (LH) and Early Bronze (EB). The natural bone material was obtained from the archaeological site Azmashka village mound, found 6 km east of Stara Zagora (Bulgaria) and also from the territory of Hrishteni village, following radiocarbonic analysis. In the sampling an atomic absorption spectrophotometry was used. The samples have been burned dry and dissolved in acid until solution with optimal element concentration. Higher concentrations of iron (Fe), copper (Cu), zinc (Zn), manganese (Mn), lead (Pb), chrome (Cr) and magnesium (Mg) were observed. The quantity of Fe, Cu, Zn, Mn and Pb were with higher values at Early Halkolith, compared to the same in the other periods. The highest heavy metals' concentrations were found, as following: iron, cooper, manganese, lead – at Early Halkolith and zink, chrome and magnesium – at Late Halkolith. The lowest heavy metals' concentrations were found, as following: iron, manganese, chrome, magnesium – at Early Neolith and cooper, zink and lead– at Early Bronze. Differences in the other elements' concentrations from the studied periods weren't significant. Qualitative differences influenced by the heavy metals in the bone structure weren't found. The content of heavy metals in the studied metacarpal bone material is considerably high compare to the normal values, mentioned by some researchers studied other species. The trend of concentration increasing is from Early Neolith to Early Bronze. This is due to the metacarpal bone contamination with soil, as which has been polluted from many years by the industrial manufacture of the nitrogen fertilizer.

**9. D. Yovchev, R. Dimitrov, D. Kostov, D. Vladova, 2012. Age morphometry of some internal organs in common pheasant (*Phasianus colchicus colchicus*). Trakia Journal of Sciences, 10, (3): 48-52. Web of Science.**

AIM: To determine some morphometrical parameters of colchis pheasant internal organs. MATERIALS: We studied 30 colchis pheasants, divided in three groups (each group was consisted of 5 males and 5 females) at 15, 17 and 19 weeks of age. METHODS: Following euthanasia and evisceration, the digestive tract was separated in segments, corresponded to its different parts (esophagus, crop, proventriculus, gizzard, small intestine, caeca and rectum). The weight of digestive structures, heart, liver, spleen and testicles was determined by

electronic scale and the length of the tubular digestive organs was measured with ruler and graph paper. The results were collected and recorded. The obtained data was processed via variable statistical methods. **RESULTS:** The body weight of the female birds was significantly lower than that of the male ones. In males the gizzard's percent decreased significantly through the whole investigative period. The proventriculus and heart proportions were almost the same with age advancing. Females were with heavier livers and spleens than males, but the spleen difference was without statistical significance. The length of the crop, esophagus and intestines had lower values in males, compared to females **CONCLUSION:** The older male and female pheasants had significantly shorter tubular digestive organs. The youngest male individuals had heavier liver, compare to the females. These alterations of the morphometrical parameters in the pheasant internal organs are provoked by sex dimorphism influence.

**10. R. Dimitrov, A. Russenov, K. Stamatova-Yovcheva, K. Uzunova, V. Yordanova, 2013.** Ultrasonographic characteristics of rabbit's pancreas. J. Fac. Vet. Med. Istanbul Univ., 39 (2): 139-147. Scopus.

Aim of the study was to demonstrate some ultrasonography specifications of the normal pancreas in rabbit and their use as model for visual anatomical imaging study of pancreatic lesions in animals and humans. We used 12 clinically healthy 8 months old of New Zealand White rabbits between 2.8 and 3.2 kilos, who were mature and all anesthetized. Our investigation had been done Diagnostic Ultrasound System and micro convex multi frequency transducer. The trial animals were starved before the experiments. Before the study we injected (per os) isotonic solution. The animals were positioned in dorsal recumbency. The ultrasonographic accesses were percutaneous transabdominal epigastric and transgastric. The pancreas was scanned longitudinally, transverse and oblique. In the four of the studied animals the pancreas were extirpated after their euthanasia. The organs were researched under liquid isotonic medium. We determined three parts of the gland. The pancreas showed similar acoustic density to the liver. The left lobe was more determined and showed more echogenicity. It has been visualized as striped finding in

front of the cranial mesenteric vein. Great amount of adipose tissue has been seen in the peripheral part of the gland that gave hyperechogenic structure of the capsule. The glandular parenchyma showed hyperechogenic linear findings. Portal vein was near the cranial mesenteric vein. The caudal vena cava was seen on the right of the aorta. Transabdominal epigastric access is very good method for visualization of pancreas in rabbits. 8 hours after their last meal an isotonic liquid was injected before the study to provide quality visualization of the gland. The

placement of the animals in dorsal recumbency is suitable condition for visualization of the gland. Filling liquid of stomach is great acoustic window for the study of the pancreas in rabbits.

**11.** Ts. Chaprazov, **R. Dimitrov**, K. Stamatova-Yovcheva, 2013. Oral abscess associated with cranial tooth loss in green iguana (*Iguana iguana*). Turk J Vet Anim Sci., 37: 615-617. IF 0.221. The aim of this study was to describe the morphology and results of treatment of an iguana's oral abscess. A case of unilateral oral abscesses with tooth loss in a male green iguana (*Iguana iguana*) was presented. Gingival necrosis and a pocket of caseous yellow-gray pus were visible in the soft tissues. Some cranial teeth were found loose within the necrotic tissue. Radiographic study showed decreased bone density. Treatment of the abscess involved opening up the pus-filled abscess and manually cleaning it out. The bacteriology confirmed a culture of *Pseudomonas aeruginosa* sensitive to enrofloxacin, gentamicin, and chloramphenicol.

**12.** A. Rusenov, G. Simeonova, R. Simeonov, **R. Dimitrov**, K. Stamatova-Yovcheva, Y. Nikolov, K. Uzunova, 2014. A case of acute renal failure following ethylene glycol intoxication in a dog. J. Fac. Vet. Med. Istanbul Univ., 40 (1): 114-120. Scopus.

The manuscript describes a clinical case of severe oligoanuric acute renal failure in a young dog following ethylene glycol intoxication. Significant deviations were established in urinary renal markers and blood biochemical parameters: severe azotemia, hypocalcaemia, hyperphosphataemia, hyperkalaemia and metabolic acidosis. The ultrasound renal findings demonstrated increased renal cortex echogenicity the typical for ethylene glycol intoxication, with a characteristic halo sign around the medulla. Electrocardiography showed a progressive decrease in amplitudes of P and R peaks, increased sharp edged repolarisation T wave. The performed symptomatic therapy did not lead to favourable outcome due to delayed intervention by the owner and non-administered antidotal therapy. The histopathological finding was consisted in degeneration, necrosis, desquamation of kidney epithelial cells, dilated tubules and multiple calcium oxalate deposits. The described changes, in our opinion, are relevant and could be used for diagnostics of the studied pathology.

**13.** Ts. Chaprazov, **R. Dimitrov**, K. Stamatova-Yovcheva, K. Uzunova, 2014. Oral and dental disorders in pet hedgehogs. Turk. J. Vet. Anim. Sci., 38: 1-6. IF- 0.22.

Hedgehogs are increasingly popular pets. As more people come to keep these unique creatures as pets, it is important to know how to properly take care of them, including how to provide the dental care they need. Hedgehogs are omnivorous with very well developed jaws and short and relatively coarse teeth with a primitive structure. The skull is low with well-developed zygomatic arches. The incisors are sharp, modified forceps that are needed for elevation of small prey. The canines are small and often look like incisors

or premolars. The molars and premolars are flat and wide. The teeth have closed root canals and grow for a limited time. Hedgehogs are prone to oral conditions. Captive hedgehogs are often affected with tooth and gum disease. Typical clinical signs and appropriate diagnostics and treatment options are discussed here where possible. The intent of this review is to provide the practitioner with a relevant and practical guide to the management of oral and dental disorders in the captive hedgehog. Proper dental care for hedgehogs will help avoid the need for treatment later.

**14. R. Dimitrov, D. Vladova, K. Stamatova-Yovcheva, P. Yonkova, D. Kostov, M. Stefanov, 2014.** Comparative imaging anatomical study of the heart and select mediastinal vessels in the rabbit (*Oryctolagus cuniculus*). Journal of the Faculty of Veterinary Medicine Istanbul University, 40 (1): 20-28. Scopus.

The aim of the study was to prove analogy of the results from ultrasonographic, computed tomographic and post mortem transverse study of the rabbit heart and select mediastinal vessels. Ten sexually mature, healthy New Zealand White rabbits, aged 12 months, with a body weight of 2.8 kg to 3.2 kg were investigated. Two - dimensional transthoracic echocardiography was performed in right and left lateral recumbency. The transducer was placed on the thorax for imaging the heart in standard planes (short and long axis). Transverse computed tomography of the thorax was carried out before and after intravenous contrast administration. The animals were positioned in ventrodorsal recumbency. The post mortem transverse frozen cuts of the thorax were 10 mm thick. By the ultrasonographic study the centrally situated hypoechoic lumen of the ascending aorta was found. The hypoechoic left and right atria (proventricles), parts of the right ventricle and pulmonary ostium with the pulmonary valve were visualized peripherally. The entire heart silhouette was observed via computed tomography. The atrioventricular septum was seen as a hypo attenuating structure. The heart ventricles, atria, ascending and descending aorta, esophagus and trachea were visualized. The four heart cavities and major vessels were marked by the post mortem transverse frozen study. The comparative analysis of the data from the ultrasonographic, computed tomographic and post mortem transverse frozen study of the rabbit heart and its mediastinal vessels showed that the results could be applied in the interpretation and diagnosis of the heart and vascular lesions in this species.

**15. R. Dimitrov, R. Michaylov, St. Ribarski, V. Doichev, V. Yordanova, 2014.** Comparative morphology of the hyoid apparatus in wild boar (*Sus scrofa*) and domestic pig (*Sus scrofa domestica*). Philippine Journal of Veterinary Medicine, 51, (1): 51-55. SJR-0.19.

The morphological features and measurements of the hyoid apparatus of nine wild boars, *Sus scrofa* (five male and four female, 2 years old,  $148 \pm 2.3$  kg body weight) and nine domestic pigs, *Sus scrofa domestica* (four male and five female, 18 months old,  $152 \pm 2.9$  kg body weight) were determined and compared. In both species, the basihyoid had a rostroventral projecting rudiment of the lingual process. At the caudal edge, the basihyoid formed an incisure which was more distinct in the domestic pig. The dorsal surface of the basihyoid in both animals formed a dimple which was better shaped and larger in the wild boar than in the domestic pig. In the wild boar, the left and right thyrohyoid were attached to the basihyoid at a smaller angle compared to the domestic pig. In the wild boar, the keratohyoid was oriented in a craniodorsal direction to the basihyoid. The stylohyoid was longer by 25% in the wild boar than in the domestic pig. The results suggest differences in the function of the hyoid muscles, in relation to masticatory and swallowing process, since the food of wild boar is rougher compared to that of the domestic pig.

**16. R. Dimitrov**, K. Stamatova-Yovcheva, S. Hamza, Y. Toneva, 2014. Transversal anatomical helical computed tomographic study of the vesicular gland: a rabbit animal model (*Oryctolagus cuniculus*). *Röntgenologiya and Radiologia*, 53, (1): 37-42. Scopus.

Spiral CT is a non-invasive imaging method of choice for animal anatomical studies. The aim of the study was to establish the imaging anatomical features of the vesicular glands in the rabbit. Eight sexually mature healthy clinically male New Zealand rabbits of 18 months of age with body weight from 2.8 kg to 3.2 kg were used. The animals were anesthetized. As contrast medium Optiray 350 was administered. The computed tomography scan was complied with certain bone and soft tissue markers. For this purpose, a whole body multi-slice spiral computed tomography scanner was used. The both soft tissue glands were heterogeneous and relatively hyperdense structures, and defined in detail from the adjacent soft tissues. The urinary bladder neck was ventrally to the glands. Both vesicular glands were better differentiated each other when the rabbit is examined in abdominal recumbence. In dorsal recumbence the shape of the transversal image of the glandular findings was oval. In abdominal recumbence both the left and the right soft tissue vesicular gland were defined. Transversal computed tomographic investigation of the rabbit vesicular gland is a detailed and definite method, to study the normal morphology of these glands.

**17. P. Yonkova**, G. Michailova, St. Ribarski, V. Doichev, **R. Dimitrov**, M. Stefanov, 2017. Fatty acid composition of subcutaneous and visceral fat depots in New Zealand white rabbits. *Bulgarian Journal of Veterinary Medicine*, 20, (3): 204-214. SJR-0.207.

The aim of this study was to identify the differences in the fatty acid composition of subcutaneous and visceral fat depots in healthy New Zealand White rabbits. Twelve clinically healthy rabbits with an average weight of  $3.00 \pm 0.03$  kg were used. The fatty acid composition of interscapular, inguinal, pericardial, perirenal and omental fat depots was determined by gas chromatography. The palmitic (C16:0) and linoleic (C18:2) acids, followed by oleic acid (C18:1) prevailed in all fat depots. The highest percentage of palmitic acid (C16:0) was detected in subcutaneous depots: inguinal ( $41.05 \pm 1.80\%$ ) and interscapular ( $38.30 \pm 0.73\%$ ), whereas the highest percentage of linoleic acid (C18:2) was found in the visceral depots: perirenal ( $44.26 \pm 0.96\%$ ) and pericardial ( $42.77 \pm 1.19\%$ ). Among the saturated fatty acids, myristic (C14:0) and stearic acid (C18:0) were established in higher content in subcutaneous depots than in visceral ones. Palmitoleic acid (C16:1) content in the pericardial fat depot was  $10.63 \pm 2.60\%$ , while in the interscapular, perirenal, omental and inguinal FD it was almost twice lower ( $P < 0.001$ ). In the omental depot,  $\alpha$ -linolenic acid (C18:3) content was significantly higher only vs the interscapular depot ( $P < 0.05$ ). The high content of saturated fatty acids in the subcutaneous depots determined their higher atherogenic and saturation index, unlike visceral ones, where a significantly higher content of unsaturated fatty acids was reported. Differences in fatty acid composition of subcutaneous and visceral fat depots proved the specific metabolism in each of them. On the other hand, this led to differences in the nutritional value of various parts of rabbit carcass.

**18.** H. Hristov, D. Vladova, D. Kostov, **R. Dimitrov**, 2017. Gross anatomy of some digestive organs of the domestic canary (*Serinus canaria*). Trakia Journal of Sciences, 2: 106-112. Web of Science.

**PURPOSE:** The domestic canary (*Serinus canaria*) is a widely spread representative of the largest avian order Passeriformis. The increased interest to canaries as pets, the scarce anatomical data and the frequently encountered digestive tract pathology are the motives of the present study. The purpose of the research was to investigate the normal anatomy and topography of some digestive organs of the domestic canary. **MATERIALS AND METHODS:** The corpses of 12 canaries at 2 years of age were investigated. The bodies were divided into 2 groups of 6 birds each. The birds from group I were dissected and anatomo-topographic features of some digestive organs were examined in situ. The obtained data were used in bodies from group II for determination of percutaneous anatomic projections of the gizzard, duodenum, ileum and the liver. The sternal margo caudalis, last pair of ribs and os pubis were used as bone markers for more precise projections. After determination of percutaneous projections of organs, the bodies of canaries from group II were subjected to

dissection for comparison of anatomical findings. RESULTS: The anatomo-topographic features of some digestive organs of the domestic canary and associated normal anatomic percutaneous projections were determined and documented. CONCLUSION: The results could serve for macroscopic in vivo and pathoanatomical diagnostic studies, as well as for prophylaxis of digestive organs' illnesses.

**19.** R. Mihaylov, **R. Dimitrov**, Sv. Krastev, K. Stamatova-Yovcheva, 2018. Morphology and anomaly of the skull of Zoo Lynx Lynx (Carnivora: Felidae): Ecological aspects for further reintroduction. Bulgarian Journal of Agricultural Science, 24, (2): 270-274. SJR -0.261.

Two skulls of zoo lynxes and one lynx skull with unknown origin have been studied. One of the lynx was male and seven years and six months old, imported from Russia and lived in the zoo in Stara Zagora. The second one was two years and six months old, imported from Czech Republic. The third lynx was from osteological collection and was with unknown origin. A comparative morphological investigation was conducted, using native and radiological study. After the osteological treatment of one skull, it was found that there was a bone defect in the caudal part of the frontal bones, which motivated our study. According to us, it was a bone anomaly, resulted by the inbreeding of the animal, often leading to the occasional appearance of asymptomatic bone defects. We suggest the origin of the lynxes to be studied carefully in their reintroduction in order to prevent the displacement of inbreeding animals. Thus, we propose that it is better to be studied the lynx ancestor for future reintroductions of the animal, which is of great importance for its ecology and surviving.

**20.** K. Stamatova-Yovcheva, **R. Dimitrov**, Ömer Gürkan Dilek, 2018. Radiographic study of the topography of the hepatic vasculature and bile ducts of the rabbit. Bulgarian Journal of Agricultural Science, 24, (3): 497-502. SJR-0.261.

The aim of the present study was to describe and illustrate the ramification patterns of the hepatic artery, portal vein, hepatic veins and bile ducts within the rabbit liver by means of postmortem angiography performed in 40 New Zealand white rabbits. The hepatic artery bifurcated into the left and right hepatic branches. The portal vein received a separate tributary from the caudate lobe before it separated into the right branch and the left branch. Five hepatic visceral tributaries of the caudal vena cava were identified: the left dorsal hepatic vein, left hepatic vein, right hepatic vein, middle hepatic vein and a proper vein of the caudate lobe. Postmortem cholangiography demonstrated the presence of a common hepatic duct. The anatomical nomenclature of the various intrahepatic blood vessels and bile ducts is critically reviewed and compared with the terminology used in radiographic studies.



**21.** Ömer Gürkan Dilek, **R. Dimitrov**, K. Stamatova-Yovcheva, 2019. The role of imaging anatomy in the contemporary anatomical studies. Bulgarian Journal of Agricultural Science, 25, (3): 1-6. SJR-0.191.

The development of Imaging technics allows anatomy to be transformed into an interdisciplinary science that includes as principles of research both classical anatomical methods and those applied in clinical disciplines. These facts are motifs for the development of a relatively new branch in the anatomical science-Imaging Anatomy. It is a contemporary trend in Anatomy, which investigates the normal images of the anatomical objects. Anatomical findings are interpreted by the imaging methods – 2 dimensional ultrasound, computed tomography and magnetic resonance imaging.

**22.** Omer Gurkan Dilek, **R. Dimitrov**, K. Stamatova-Yovcheva, D. Yovchev, R. Mihaylov, 2019. Importance for experiments in human medicine of imaging modalities for macroanatomical and histological study of rabbit suprarenal glands. Med. Weter., 75, (11): 684-692. IF Scopus-0.383. SJR-0.186.

The morphological characteristics of the rabbit adrenal glands are currently investigated using routine imaging modalities. The aim of the study was to collect and interpret major findings and information in the literature on the rabbit as an animal model for investigations in humans. The suprarenal glands of thirty-four mature, clinically healthy New Zealand rabbits were studied using anatomical, routine histology, radiology, computed tomography, ultrasonography, and magnetic resonance imaging methods. The results demonstrated that the rabbit suprarenal glands are paired ellipsoid organs. The right gland was close to the right kidney, whereas the left gland was located at a distance from the left kidney. The capsule was composed of dense connective tissue. The parenchyma consisted of three zones: zona glomerulosa, zona fasciculate, and zona reticularis. The medulla was in the center of the glandular parenchyma. The glands' radiological and CT features defined their position relative to the right and left kidneys. The right suprarenal gland was with normal attenuation. The left suprarenal gland was located at a distance from the left kidney. The US features of the glands demonstrated variability in darkness and contrast, revealing specific histological features. The MRI peculiarities of the glands defined them as well visible findings.

**23.** R. Mihaylov, **R. Dimitrov**, K. Stamatova-Yovcheva, F. Fejzulla, 2019. Investigation of the opportunities for introduction of the wild turkey (*Meleagris gallopavo*) in the territory of Bulgaria. Bulgarian Journal of Agricultural Science, 25, (4): 717-723. SJR-0.191.

In Biology the introduction is the establishment of outlandish species within the borders outside their natural range (natural habitats) under conditions in which they have not previously

developed. The aim was to investigate the possibilities of introduction of wild turkey (*Meleagris gallopavo*) in the territory of Bulgaria and the changes to which they might have led to the morphological features of this species. The study was carried out in the territory of Trankovo village, Stara Zagora region (the pheasantry is a part of Mazalat), the territory of Stara Zagora Zoo and in a licensed game farm Graus. The used methods are:

- interviews with poultry specialists;
- photographic method – photo-documentation of areas, inhabited by wild turkeys and photo-documentation of morphological features of live wild turkeys;
- biometric morphological method.

In Bulgaria there are real opportunities for introduction of wild turkey due to the presence of objects with parental herds – the pheasantry in the village of Trankovo and the Zoo in Stara Zagora. The program for the production and displacement of birds bred in farms does not work with wild turkey, although it has been included in the program from 2006. Hunting farms prefer to buy wild turkeys ready for shooting from the pheasantry in Trankovo rather than rear them in the hunting area. When trying to introduce a group of wild turkeys, it should be composed of young and adult birds as well. The birds that are displaced should be at a distance from the rest that they cannot hear the birds from the parent flock. In order for a higher percentage of birds to survive, strict control must be carried out over the harmful predators – foxes, jackals and martens.

**24.** K. Stamatova-Yovcheva, **R. Dimitrov**, R. Mihaylov, Omer Gurkan Dilek, 2020. Color Doppler anatomical assessment of the vessels in the rabbit liver. *Bulgarian Journal of Agricultural Science*, 26, (3): 669-673. SJR-0.248.

The aim of the present study was to investigate the geometry, topography and trajectory of the rabbit liver's vessels by color Doppler US. Ten sexually mature healthy clinically New Zealand white rabbits, aged 8 months and weighed from 2.8 kg to 3.2 kg have been studied. The results were related to the color geometry of the vessels, which was used to define their topography. The visualization of the rabbit liver blood and biliary vessels was real and corresponded to the variations of the color Doppler spectrum from blue to red gamma. The hemodynamic data were simultaneous to the morphological results. Both they represented anatomical information for the studied vessels. The present investigation is with practical application in the morphological science. It is summarized that the Doppler US study of the rabbit liver is suitable to obtain detail information for the anatomical and physiological characteristics of the organ. In conclusion the results could be used as a morphological base for investigation in human and rabbits.

**25.** Ömer Gürkan Dilek, Hasan Erden, Erkut Turan, **R. Dimitrov**, K. Stamatova-Yovcheva, Emine Karakurum, 2020. The qualitative and quantitative assessment of the renal cortex of the

clinically healthy rabbits. Ankara Univ. Vet. Fak. Derg., 67: 381-386. e-ISSN 1308-2817. Web of Science IF-0.426.

Qualitative ultrasonographic images in diagnosing renal parenchymal diseases can be inadequate. The relationship between renal cortical echogenicity and parenchymal disease has been demonstrated in people. However, it is difficult to determine diffuse fat vacuoles and the parenchymal diseases at qualitative renal assessment. Disorders of the renal cortex are frequently seen in rabbits. The aim of this study was to qualitatively and quantitatively evaluate the echogenicity of the renal cortex in clinically healthy rabbits. Forty-two clinically normal and with no history of renal disease rabbits were used. The each rabbit was investigated by complete blood count, urinalysis and renal biopsy. Renal ultrasonography was performed with a 6.5 MHz probe. For each image, three equally sized regions of interest was detected within the renal cortex. The mean pixel intensity was determined using an 8-bit grayscale, with 256 colour of grey colours. Qualitative echogenicity was evaluated by two observers. Observer 1 evaluated as an isoechoic (36/42) and hyperechoic (6/42). Observer 2 evaluated as an isoechoic (35/42) and hyperechoic (7/42). Quantitatively, the mean pixel intensities analysed for the renal cortex was  $59.2 \pm 2.23$  (range: 28-91). The result of this study indicates that analysis of digitized renal cortical ultrasonographic images from rabbits using the histogram technique can be used to quantitatively determine echogenicity.

**26. K. Stamatova-Yovcheva, R. Dimitrov**, 2021. Anatomical and CT anatomical study of the rabbit liver in dorsal planes. Trakia Journal of Sciences, 2: 122-129. Web of Science.

The focus of the research was to investigate the anatomical location of the rabbit liver. Thus, we applied a topographic algorithm, using dorsal frozen cuts and CT algorithm with coronary slices. The used animals were 13 matured, healthy clinically white New Zealand rabbits. We measured the metric CT parameters – transverse and craniocaudal sizes. At the level of the dorsal plane, located 15 mm ventrally from the spine, dorsal part of lobus hepatis sinister was found, and on the right and laterally - lobus hepatis dexter. At the level of the dorsal plane, located 30 mm ventrally from the spine, lobus hepatis dexter was located cranially relative to lobus hepatis sinister medialis and reached caudally to pars pylorica. Lobus hepatis sinister lateralis remained caudal to lobus hepatis sinister medialis and touched corpus ventriculi. Lobus hepatis sinister lateralis was found cranially to corpus ventriculi and pars pylorica. Lobus caudatus caudally touched the right kidney. At the level of the dorsal plane, located 45 mm ventrally from the spine, lobus hepatis dexter was found to be in the same dorsal plane with the left lobe of the liver. CT normodense heterogeneous anatomical image of lobus hepatis dexter was parallel to that of lobus hepatis sinister, which determined the transverse location of the

organ. The obtained imaging analysis of the liver's anatomical parts and their proximity to other organ structures were interpreted depending on their attenuation profile. The transverse size of the organ at 15 mm ventrally from the spine showed a value of 76.16 mm, and at 30 mm ventrally, this parameter reached a value of 81.48 mm. The highest values were obtained at 45 mm ventrally - 85.21 mm. CT anatomical study added and confirmed the results of the topographic investigation.

**27. R. Dimitrov**, 2021. MRI Anatomical investigation of rabbit prostate gland. Bulgarian Journal of Veterinary Medicine, 2021 Online First. ISSN 1311-1477; DOI: 10.15547/bjvm.2434. SJR-0.211.

The aim of the study was to provide diagnostic imaging data on rabbit prostate complex by means of magnetic resonance imaging (MRI) with regard to their use in morphological investigations of the gland. Six anaesthetised sexually mature clinically healthy New Zealand White rabbits, 8 months of age, with body weight 2.8–3.2 kg were used. The pelvic cavity and pelvic organs were investigated in the sagittal, dorsal and transversal planes from the 7th lumbar (L7) to the 1st coccygeal (C1) vertebra with 2-mm slice thickness using a Magnetom Essenza 1.5T tunnel MRI scanner. The prostate complex (propr prostate, prostate and paraprostate parts) demonstrated signal hyperintensity on T1-weighted MRI images. The prostate capsule was hyperintense compared to glandular parenchyma. The prostate complex was visualised on slices between the caudal part of the first sacral and cranial part of the third sacral vertebrae. The prostate part signal was hyperintense on T2-weighted MRI images. The shape of the prostate complex in dorsal view was craniocaudally elongated, oval and localised bilaterally from prostatic urethra in ventrodorsal view. The transverse T2 image of the pelvis through the 2nd sacral vertebra delineated the prostate part of the gland as a bilateral bilobed oval structure with hypointense parenchyma, embraced by a hyperintense capsule. The intrapelvic localisation and the shape of MRI image of healthy rabbit prostate complex is a species-specific morphological feature. The signal hyperintensity of rabbit prostate complex was higher on T2-weighted images. The T2 hyperintensity of prostate part vs hypointensity of propr prostate and paraprostate parts provide evidence for the presence of substantial amount of glandular elements, presuming a dominating role of prostate part in the secretory function of the glandular complex.

**Приложение 8.2. Г.8. Статии и доклади, публикувани в нереферирани списания с научно рецензиране или публикувани в редактирани колективни томове.**

**1. Р. Димитров**, Хр. Христов, Г. Костадинов, Н. Цандев, 2011. Някои Морфологични Особености На Resectaculum Ductus Deferens При Домашния Канар (Serinus Canaria). vol.

I, № 5, Animal studies & Veterinary medicine, стр. 72-76. Двадесет и първа международна научна конференция 2-3 юни 2011 Посветена на 50 години от основаването на Съюза на учените в Стара Загора.

The aim is finding morphological characteristics of receptaculum ducus deferens. We investigated 10 male sexually mature birds (*Serinus canaria*), aged 13 months, in active breeding season. Receptaculum ductus deferentis was situated in the caudal segment of the duct deferens and took 1/3 from its length. The epithelium was pseudostratified columnar, and the muscle layer was developed and consisted of one circular stratum. The seminal sac is a tubular plexus, in which there isn't stroma and capsule. The lumen of its consisted tubules is filled with seminal liquid, because of the sexual activity's status in the studied birds.

**2. R. Dimitrov, M. Gulubova, T. Vlaykova, A. Vodenicharov, 2011. Localization, density and shape of serotonin - and chromogranin a-positive neuroendocrine cells in feline bulbourethral glands. Slovak J. Anim. Sci., 44, (4): 140-145.**

The current study aimed to investigate the presence, type and localization of endocrinocytes containing serotonin and chromogranin

A (NE) in feline bulbourethral glands and their role in the functioning of those organs. Bulbourethral glands of 8 sexually mature, clinically healthy male European shorthair cats (*Felis catus*) aged 1–2 years and weighing 2.8–4 kg were studied. Collected specimens were processed by routine techniques and embedded in paraffin. Immunohistochemical assay was carried out with primary antibodies against human serotonin and chromogranin A using the avidin-biotin peroxidase technique. Neuroendocrine cells (NE) were mainly observed in the tubular epithelium. In the glandular stroma, only single serotonin-positive endocrinocytes (SNE) were found. The density of serotonin-expressing endocrinocytes was higher than that of chromogranin A-expressing cells (ChNE), while the latter were larger and of a various shape than the former. The morphology of studied neuroendocrine cells was of both open-type and closed-type. We propose that neuroendocrine cells in feline bulbourethral glands were involved in the protection of glandular epithelial cells, in homeostatic regulation of glands' secretion and semen and urinary excretion.

**3. Н. Цандев, Д. Костов, Р. Димитров, В. Иванова, А. Павлов, 2011. Методи за включване на анатомични обекти в метилметакрилат и тяхното използване в практиката. Сборник доклади ISBN: 978-954-397-025-4 Scientific Papers, 592-597.**

With the help of special methods of work with methylmetacrylate there are anatomical preparations made out from various domestic animals' body parts. These preparations are long lasting and suitable for educational purposes in the scope of Anatomy. Because of the fact that

they allow very good visualization of the anatomical structures, the so made models would serve as well in the education of specialists in this field of study as they do for the students of Veterinary medicine. The exponents made with the help of these methods are highly durable, also the tissues in their content are held in fresh condition. Yet it is important that the preparations do not release toxic substances or specific odour and they do not require particular preservation conditions.

**4. Stamatova-Yovcheva, K., Dimitrov, R.,** Chaprazov. Zv., Russenov, A., Yovchev, D., 2012. Magnetic resonance imaging application rabbit liver anatomy. Correlation with cadaver cross-sectional cuts. Book of Proceedings, 3th International Scientific Meeting, Days of Veterinary Medicine, 2-4 September, Scopie, Republic of Macedonia, 239-242.

The aim of the present study is to prove correspondence between magnetic resonance imaging anatomical features of the rabbit liver and these of the native cross sectional anatomy of the same organ, in order to apply this imaging technique in modern interpretation of the animal anatomy. We studied ten healthy New Zealand white rabbits, aged 9 months, weighted 2.8 to 3.2 kg. In the magnetic resonance imaging study the animals were positioned in spine recumbence. To obtain best results we used distance scan's slices. A native topographic anatomical study was performed with five animals. There was proved correlation between magnetic resonance features of the rabbit liver with these of the native anatomical investigation of this organ. The rabbit liver was homogeneous structure with intermediate intensity, compared to the adjacent soft tissues. There wasn't visible border between liver lobes. The organ was highly contrasted from stomach and its three parts (fundus, body and pyloric part). In the native anatomical cross-sectional frozen study the rabbit liver lobes were found. The organ was in close contact to the same structures, imaged on magnetic resonance. The comparison between the rabbit liver's imaging anatomical and native transversal study could be applied in the interpretation and diagnosis of many rabbit and human liver diseases.

**5. R. Mihaylov, R. Dimitrov, V. Yordanova,** 2012. Comparative electronmicroscopical study of the enterocytes of the duodenum of the Japanese quail (*Coturnix japonica*) and the wild type (*Coturnix coturnix*). Agricultural Science and Technology, 4, (3): 328-331.

The main goal of the study was to be determined some age linked ultrastructure features of the duodenum in specific bird species. The investigated are 20 birds from each – Japanese and Wild quails. They were divided into four age groups (1, 20, 45 и 60 day of hatching; 5 birds in each age group). The -st -th -th materials for the electron microscopic study were obtained from the middle section of the duodenum. Onto the apical surface of the enterocytes of the duodenum with the one day old Japanese and Wild quails were determined evenly located and with similar

height microvillies. They covered the apical surface of the enterocytes and around the apical parts was seen glycocalyx. The height of the duodenal microvilli of the twenty days old Japanese quails was greater from those of the one day old. The 45 days old and 60 days old quails the microvilli, covering the apical surface of the enterocytes were evenly placed, but their height was continuously growing. The height of the duodenal microvilli of the one day old Japanese and Wild quails was equal. With the 20, 45 and 60 days old quails, the height of the microvilli of the Wild type were higher from the microvillies of the Japanese quails. We believe the difference of the microvillies height of the duodenum with the Wild and the Japanese quail is due to the distinction in the nutritive habits and requirements of the investigated birds. The Wild quail is a bird, which is in a need of greater reabsorption mucosa of the small bowel and most likely is the reason the duodenal microvilli to be higher compare to the Japanese one.

**6. Михайлов, Р., Димитров, Р.,** Стаматова-Йовчева, К., Йовчев, Д., Задев, В., Славов, Т., 2014. Сравнително морфометрично изследване на скелета на главата при някои видове от сем. Canidae в България. Екология и бъдеще, ГОД. XIII, No. 1–2: 12-21. Научно списание за селскостопанска и горска наука.

Objective: We performed craniomorphometrical analysis of the head skeleton (skull) in 24 mature animals, possessed of four (4) species from family Canidae. The skulls were parts from the osteological collections. Methods: The studied eleven parameters were presented by native figures and X-ray images. The results were processed by variable statistical analysis. The longest measurements of the head skeleton (skull) were determined. Results: Condilobasal length showed lower absolute measurements compared to the biggest length of the head skeleton. The dorsal length of the brain skeleton of the wolf was 55.9%, in the dog – 56.4%, in the jackal – 55.5%, and in the fox – 54.2% of the biggest length of the head skeleton. The basal length of the brain skeleton showed lower absolute measurements compared to the dorsal length of the brain (cranial) skeleton. The dorsal length of the facial skeleton was with lower measurements compared to the dorsal length of the brain skeleton. The wolf's and jackal's zygomatic width was 55.8% of the biggest length of the head skeleton, the dog's – 55.1% and the fox's – 54.2%. The internal length of the brain (cranial) cavity was 46% from the biggest length of the head skeleton of the wolf, 44.1% of the dog, 48.7% of the jackal and 45.8% of the fox. The height of the brain (cranial) skeleton was 29% of the biggest length of the head skeleton of the wolf, 30.5% of the dog, 30.9% of the jackal and 28% of the fox. The brain skeleton volume was greatest in the wolf and smallest in the fox. Conclusion: The volume-body coefficient (VBW) is an indirect indicator for the relative size of the brain, as it was highest in the fox and lowest in the dog. The obtained X-ray images demonstrated the

investigated by us craniological markers and could be used for the craniomorphometric characteristics of the studied species. Our results and the published information from many authors motivate us to purpose, that the animals with greater size of brain cavity volume, respectively with greater cerebrum adapt better. Therefore, we could support the theory of connection between the size of the brain and the survival of the mammals in new environment.

7. K. Stamatova-Yovcheva, **R. Dimitrov**, D. Yovchev, K. Uzunova, R. Binev, 2014. Ultrasound anatomical visualization of the rabbit liver. Scientific Papers: Animal Science and Biotechnologies, 47, (2): 207-209.

The topic was to investigate the anatomical features of the rabbit liver by two- and three-dimensional ultrasonography. Eighteen sexually mature healthy clinically New Zealand rabbits aged eight months were studied. Two-dimensional ultrasonographic anatomical image of the rabbit liver presented it in the cranial abdominal region as a relatively hypoechoic finding. Its contours were regular and in close contact with the hyperechoic diaphragm. Liver parenchyma was heterogeneous. The gall bladder was visualized as an oval soft tissue structure, filled with anechoic content. Its walls were hypoechoic. Two-dimensional ultrasonographic anatomical image of left hepatic lobe was sharply distinguished to right hepatic lobe's outlines. In three-dimensional ultrasonographic anatomical study, the organ image was in three orthogonal planes. Its relief was regular and uninterrupted. Left hepatic lobe was found on the left and the right hepatic lobe was a soft tissue point for gall bladder position. Left and lateral was left lateral hepatic lobe. It was covered partly by left medial hepatic lobe. The right hepatic lobe was visualized as a single structure. The gall bladder was an oval finding. Its walls were hyperechoic and regular, without roughness. The results could be used as a base for modern interpretation of rabbit liver anatomy.

8. Р. Михайлов, **Р. Димитров**, К. Стаматова-Йовчева, В. Радев, 2014. Случай на язвена болест при огърлично пекари (*Pecari tajacu*). Екология и Бъдеще, Год. XIII, No. 3 Научно списание по екология и околна среда Scientific Journal of Ecology and Environment, vol. XIII, No. 3, 76-80.

The clinical case concerned a female collared peccary from Zoo in Stara Zagora, at the age of 10 years with body weight of 18 kg. Peccary demonstrated variable appetite, weight loss, kyphosis, musculoskeletal instability, anorexia and recumbency. Single ulcerative defects were observed in the squamous portion of the gastric mucosa, in the area of the gastric pouch. The ulcers were oval erosive defects, which were well defined by the close soft tissues by whitish shaft. The mucosal surface of the gastric pouch had multiple oval nodes. The some stress factors, according to us, have influenced disease manifestation.



9. Р. Михайлов, **Р. Димитров**, К. Стаматова-Йовчева, Д. Йовчев, Ст. Стоянов, 2014. Сравнително морфометрично изследване на скелета на главата при някои видове от сем. Suidae. Животновъдни науки, 3: 22-30.

The aim of the study was to make a comparative craniological analysis of wild and domestic swine and warthog. We investigated the head skeleton of 27 individuals belonging to 3 animal species of family Suidae - wild swine (*Sus scrofa scrofa*), domestic swine (*Sus scrofa familiaris*) and warthog (*Phacocheirus africanus*). The values of 9 craniological parameters, were determined. In domestic swine's the head skeleton was shorter, compared to the wild swine and warthog. Domestic swine's condylobasal length was the greatest. The facial skeleton was more developed than the brain one that proves thesis that face's shortening is connected with adaptation to predation. Wild swine's head skeleton shape differed to this of domestic swine and warthog. Greater height of domestic swine's brain cranium was resulted by the fact that its frontal bones are not plate and they form an angle along them. The brain cavity's volume is the greatest in the wild swine, which probably is an advantage for mammal's surviving.

10. D. Vladova, D. Yovchev, **R. Dimitrov**, M. Stefanov, P. Hristov, 2014. Light microscopy of the adipose tissue distribution along the coronary branches in the myocard of the New Zealand white rabbit. Agricultural Science and Technology, 6, (4): 423-426.

The New Zealand White rabbit (*Oryctolagus cuniculus*) is bred as a laboratory animal, pet and last but not least for meat production. It is prone to accumulating a lot of fat and muscle. The aim of the study is to examine the morphological nearness of the myocardial coronary branches with adipocyte depots in rabbits by means of optical microscopy. Histological preparations were made from the walls of rabbit hearts and were studied through light microscopy. The spread of adipose tissue along the coronary branches in the cardiac muscle was examined. Subepicardially the coronary branching is attended by vast fat depots. However, intramurally it is free from adipocytes.

11. **R. Dimitrov**, 2015. Cranial anatomical landmarks for helical computed tomography (CT) visualization of rabbit bulbourethral glands. Indian Journal of Applied Research, 5, (1): 575-576.

The bulbourethral glands of ten sexually mature clinically healthy rabbits 12 months of age, from the New Zealand white rabbit breed with weight between 2.8 kg and 3.2 kg were studied. The animals were positioned in ventrodorsal (supine) recumbence. Contrast enhancement was applied. The glands were visualized by helical anatomic CT at the transverse plane through the cranial part of the 2nd coccygeal vertebra (dorsally), tabula of ischium (laterally) and the sciatic part of the pelvic symphysis (ventrally). Should be written as separate

words - We can therefore conclude that contrast anatomical helical CT study of the rabbit bulbourethral glands is definitive to be obtained imaging anatomical data for the glandular morphology.

**12. R. Dimitrov, K. Stamatova-Yovcheva, Fejzullah Fejzulla, 2015.** Middle anatomical landmarks for visualization of rabbit bulbourethral glands at helical CT. *International Journal of Multi Dimensional Research*, 3, (2): 169-173.

Ten mature clinically healthy rabbits were studied. The bulbourethral glands were scanned by helical computed tomography. The animals were positioned in supine recumbence and contrast agents were applied. The pelvis was scanned in the transverse level through the transition between 2nd and 3rd coccygeal vertebra (dorsally), tabula of ischium (laterally) and sciatic part of pelvic symphysis (ventrally). The glandular borders were well defined. The bulbourethral glands' images were replaced dorsolaterally to the urethra's walls. The localization of the median septum, that separates the glands, is defined difficultly. Contrast anatomical helical CT study could add data which are suitable for the imaging anatomical status of these organs in the rabbit.

**13. R. Mihaylov, R. Dimitrov, 2015.** Comparative weight and metric traits of intestines in Japanese quails (*Coturnix coturnix Japonica*), common quails (*Coturnix coturnix*, Lineus, 1758) and their hybrids. *International Journal in Physical & Applied Sciences*, 02, (05): 33-38.

A total of 26 quails (9 Japanese quails, 9 common quails and 8 Japanese females × common males hybrid quails) were studied. The individual live weight of birds was determined, as well as the weights of the duodenum, jejunum, ileum, caeca and rectum (g), and the length of these segments (cm). Data was statistically processed. The absolute and relative weights of intestinal segments were the highest in Japanese quails, followed by hybrid quails and the lowest – in common quails. In the three studied types of quails, the jejunum had the highest absolute and relative weight among intestinal segments, followed by the duodenum. The relative duodenal weight in the wild quail was by about 8.3% higher than in Japanese quails. A marked difference was also detected in caeca – their relative weight in Japanese quails was by 6.5% higher than in common quails. The highest absolute and relative length among all intestinal segments was that of the jejunum. The relative length of the duodenum in common quails was by 9% higher than in Japanese quails. The L/m index of the entire intestinal tract was the highest in wild quails, followed by hybrids and Japanese quails. In our belief, the common quail attains its ultimate body weight with relatively thinnest intestinal wall which indicated its higher functional activity as compared to the other studied groups of birds.

**14.** K. Stamatova-Yovcheva, **R. Dimitrov**, M. Stefanov, Omer Gurkan Dilek, J. Toneva, 2015. What kind of imaging modality should be chosen when study rabbit liver anatomy: CT or MRI. International Journal in Physical & Applied Sciences, 02, (05): 99-107.

The aim of the present study was to investigate and compare CT and MRI imaging anatomy of the rabbit liver. As anatomical bone landmark, we used Th8. Ten sexually mature; healthy clinically rabbits have been studied. Computed tomographic (CT) and magnetic resonance imaging (MRI) studies were performed in compliance with the standard imaging anatomical protocol when study the rabbit liver. The studied animals were positioned in dorsoventral (abdominal) recumbency. When the aim is to find topographic localization of the liver (its lines, lobes, edges and position relative to adjacent organs), transversal helical CT anatomical study of the cranial abdominal region, at the level of Th8 is a high informative method. The anatomical data for the rabbit liver, obtained by MRI, give real and precision information for its lobes, topography of the big vessels, interlobar visualization of the gall bladder, gall bladder's parts, beginning of the cystic duct and topography of the investigated organ to close structures which are with similar and higher level of magnetization.

**15.** K. Uzunova, Mehmed Halil, **R. Dimitrov**, K. Stamatova-Yovcheva, D. Yovchev, T. Penev, K. Nedelkov, 2015. Fear and aggression in German Shepherd, Boxer and Rottweiler dogs. Scientific Papers: Animal Science and Biotechnologies, 48, (1): 230-233.

As a result of long-term active fear, variable moods can occur – howling, whimpering, crying, tremor, tics, manias, depressions, etc. It is now acknowledged that fear and aggression are closely related. It is also known that the different dog breeds manifest a various extent of fear and aggression. The study aimed to provide answers to two questions - classification of factors invoking fear and aggression according to their significance and which of investigated dog breeds – German Shepherd, Rottweiler or Boxer is the most resistant to fear and aggression episodes? The exclusion of all factors on the rearing of three breeds of dogs / they complied with the norms / found that the causes of fear aggressive conditions are listed as follows – first of fear and aggression depend on the temperament of the dog and on the second place of the breed origin, growing conditions and the associated level of primary and secondary socialization. Fear aggressive manifestations occur at least in dogs with sanguine and choleric temperament. Representatives of the breed "Boxer" and "German Shepherd" are at the same level on the manifestations of fear and aggression. Rottweiler breed is in third place in this direction.

**16.** R. Mihaylov, **R. Dimitrov**, V. Radev, 2015. Cases of animal escapes from zoos (Subject of area: Zoo animals). International Journal in Physical & Applied Sciences, 2, (06): 40-45.

The zoo area, zoo park, menagerie or simply the zoo is a series of spaces with constructed facilities, in which the animals are allowed to reproduce. We set the following goal: study the cases of animal escapes from Bulgarian zoos. The research was conducted within the territory of the zoo in the city of Stara Zagora for the period from 20 May 2005 to 20 February 2015. Escapes of animals beyond the enclosures occur in all zoos for various reasons. The Stara Zagora zoo is no exception. This case made it clear to us that the animals take advantage of the imperfections of the enclosures. This is proof of the active thought processes in animals and the way the mistakes done by people while placing the fences can be taken advantage of.

**17. Р. Михайлов, Р. Димитров, Б. Михайлов, Т. Славов, 2015. Спасяване на животни попаднали в беда и неестествена среда. Животновъдни науки. ЛП (52), 4: 85-90.**

The history of six cases of animals in trouble or unusual environment – two dogs, a swan, two cows and a bear – is described. The analysis of rescue activities demonstrated that in the Republic of Bulgaria, there is no competent state or local structure engaged with rescue of animals in trouble or atypical environment. The experience of people charged with these activities until now could be used for training of the staff of a future similar organization or animal police.

**18. K. Stamatova-Yovcheva, R. Dimitrov, P. Yonkova, Tz. Chaprazov, D. Yovchev, Fejzullah Fejzulla, 2015. Anatomical radiological features of abdominal aorta and some of its branches in the rabbit in the segment Th12-L3. International Journal of Research in Engineering and Applied Sciences, 5, (6): 151-158.**

Ten sexually mature rabbits of New Zealand white breed were studied. Post mortal angiography of abdominal aorta was conducted. The results from post mortem angiography in ventrodorsal recumbency presented topography and anatomical location of abdominal aorta and some of its branches in the cranial and middle abdominal region. Celiac artery was visualized at the transition between Th13 and L1. Splenic artery belongs to the common gastrolial trunk. Left gastric artery, gastroduodenal artery, common hepatic artery, proper hepatic artery arise from celiac artery as separate branches. Left and right hepatic arteries are branches of proper hepatic artery. The post mortem angiography of abdominal aorta and its branches in dorsoventral aspect in the segment between Th12-L3 gives information about topography, anatomical location and way of the abdominal aorta, celiac artery, right and left renal arteries. Left cranial abdominal artery is well defined vessel. In both projections (ventrodorsal and dorsoventral), the transition between Th13 and L1 is anatomical landmark for beginning of celiac artery.

**19. R. Dimitrov**, 2015. Anatomical transverse helical CT study of the postprostate part of the rabbit urethra. *Animal Health, Production and Hygiene*, 4, (1): 382-386.

Background/Aim: The imaging anatomical investigation of the urinary bladder can be done by positive and negative contrast cystography as double-contrast cystography. The topic of the study was to investigate the anatomical radiological features of the rabbit urinary bladder and pelvic urethra. Material and Method: Eight healthy male, sexually mature white New Zealand rabbits were investigated. Following anesthesia an antegrade contrast and retrograde positive and negative cystography and urethrography were performed. Result and Conclusion: In the non-contrast anatomical radiological study the urinary bladder was visualized with low X-ray attenuation. In the retrograde positive and negative contrast anatomical presentation of the urinary bladder and pelvic urethra, the bladder showed an image with enhanced X-ray attenuation. The bladder was pear-shaped and completely localized in the caudal part of the abdominal cavity, ahead of the pelvic threshold, as cranial it reached the middle of the fourth lumbar vertebra. Bladder mucosa was with smooth relief. Double contrast anatomical presentation showed the bladder image as a soft tissue finding with peripheral negative contrast zone and two positive contrast areas. Lateral projection of the double contrast organs showed that the image of ureter-bladder drainage was found on the dorsocaudal wall of the bladder, in the transition between body and neck, at the level of the seventh lumbar segment. The image of the pelvic urethra's beginning part was visualized caudodorsal to the ureters' openings.

**20. R. Dimitrov, K. Stamatova-Yovcheva**, 2015. Imaging anatomical radiological investigation of rabbit urinary bladder and pelvic urethra. *Animal Health, Production and Hygiene*, 4, (1): 387-392.

Background/Aim: The male urethra in domestic mammals is composed of pelvic and penile part. The pelvic part consists of preprostate and prostate part. The aim of the study was to present data for helical CT visualization of the rabbit postprostate urethra. Material and Method: Ten mature clinically healthy male New Zealand white rabbits were studied. The animals were anesthetized. The bone landmarks at the helical CT study were identified. The peroral and parenteral contrast agents were administered. A whole body multi-slice helical computed tomography scanner was used. Result and Conclusion: CT scan of the pelvis in the transverse plane through the third, fourth sacral and first coccygeal vertebra, body of ischiadic and ischiadic symphysis visualized the following: urethral hypoattenuated lumen was dorsal to the pelvic symphysis; the urethral lumen's shape was ovoid with regular contours and flattened dorsoventral; the urethral wall was relatively hyperattenuated, compared to the close soft tissues,

except the rectal finding. The study creates a detail picture for the postprostate urethra that shows the method's benefits.

**21.** Р. Михайлов, **Р. Димитров**, К. Узунова, И. Върляков, М. Халил, И. Хубенова, 2015. Състояние на безстопанствената кучешка популация на територията на община Стара Загора. Животновъдни науки, 52, (6): 80-84.

The present status of the stray dog population at the territory of the Stara Zagora municipality and the work of the municipal stray dog kennel have been evaluated. A complete hygiene assessment of all elements related to the environment of dogs was performed. It was found out that stray dog population in the municipality was not reduced due to the occurrence of so-called "pseudo home-owned dogs" which are not registered by the owners as required by the legislation. Two primary reasons for the failure of the stray dog problem solution were identified. The pseudo home-owned dog category is a permanent source for stray dogs. The occurrence of stray dogs is attributed to lack or poor control from the part of an authorized structure.

**22.** R. Mihaylov, **R. Dimitrov**, R. Binev, R. Vasilev, B. Mihaylov, Fejzullah Fejzulla, 2016. Reasons for escape of animals from zoos. International Journal in Physical & Applied Sciences, 03, (08): 1-11. ISSN: 2394-5710.

Escape of animals from zoos are threatening factors to the public. The aim of the study is to carry out analysis of the presented facts and investigation of the circumstances and reasons for escape of animals from zoos in Bulgaria. The investigation was conducted on the territory of the city zoo Stara Zagora. Materials from personal archives, opinions of experts from zoo and publications were used. Methods of interviewing of officials and eyewitnesses of the incidents were applied and photo documentation of the cases. Animals in zoos take advantage of opportunities to escape because some facilities in zoos are not consistent with the biology of the inhabitants. The main reason for animals' escape is the human mistake. In some single cases of escapes, the animals were killed because they represented serious threat to the society.

**23.** П. Йонкова, П. Бойкова, Р. Манолова, Д. Костов, **Р. Димитров**, 2017. Кратка морфологична характеристика на щитовидните жлези при пилета бройлери и патици. Ветеринарна сбирка, 1-2: 22-27.

Поддържането на птиците в добро здравословно състояние е гаранция за нормалния им растеж и развитие, което от своя страна е от съществено значение за добиване на месо с добри вкусови качества и висока хранителна стойност. За тази цел, в практиката се прибегва до използването на различни фуражни добавки и подобрители. Има обаче и вещества, чието използване е забранено при изхранването на животните и птиците. Едни

от най-стриктно следените субстанции в живите животни и птици, както в суровини и продукти от тях, са антигиперлипидемичните агенти - Thiouracil, Methylthiouracil, Propylthiouracil и Methamizole. Те се причисляват към списъка на субстанциите с анаболен ефект и непозволените вещества - приложение 1 на Директива 96/23/ЕО.

**24.** R. Mihaylov, **R. Dimitrov**, R. Binev, K. Stamatova-Yovcheva, 2017. A study of some biological, anatomical and related environmental features of Nutria /*Myocastor coypus*/ from the territory of Stara zagora region. MAE Vet Fak Derg., 2 (1): 7-15.

The nutria (*Myocastor coypus*) belongs to the class of Mammals, Rodents order, family Myocastoridae. It leads a semiaquatic lifestyle and can be seen around rivers, lakes and marshes. Nutria is the biggest rodent in Bulgaria. It lives mainly along the rivers of southeastern Bulgaria. The animal's body is cylindrical in shape, with relatively large head and short ears. The peak of the face is blunted with clearly visible teeth, colored in bright orange. Nutrias are mostly herbivores. Their role is to spread diseases such as equine encephalomyelitis, leptospirosis, hemorrhagic septicemia (Pasteurellosis), paratyphoid and salmonellosis. The aim of the study is to examine the impact of nutria on the environment on the territory of Stara Zagora region, and some of its biological and anatomical features. In some territories of Stara Zagora were found traces of life activity of nutria, as entrances of shelters, footprints of thoracic and pelvic limbs, and feces. Nutrias have not permanent habitats. In the study we found no evidence of damage on the environment. The study showed that the result of the vital activity of nutrias is rather positive, concerning the cleaning of the water areas of vegetation. We found that the thoracic and pelvic limbs have five fingers. The difference between the volume of the nutria cranial cavity and these of the jackal and fox is provoked by the differences in the type of their food and lifestyle.

**25.** H. Hristov, D. Vladova, D. Kostov, **R. Dimitrov**, Ts. Chaprazov, N. Goranov, 2017. Proventricular dilatation disease: Anatomical aspects of diagnostic in the domestic canary (*Serinus canaria*). Bulgarian Journal of Veterinary Medicine, 20, Suppl. 1: 37-44.

Nine domestic canaries (*Serinus canaria*) were examined, six of which were clinically healthy, while the other three exhibited signs of proventricular dilatation disease (PDD). All birds were subdued to contrast radiography with subsequent dissection/autopsy depending on the health status of the birds. The data obtained from the contrast radiography, the classical dissection and autopsy were compared. Considering the caudal border of *proventriculus gastris* observed in normal birds, as it reaches the line through the last pair of ribs, it should be noted with respect in diagnostics that in cases of PDD the proventriculus was displaced significantly backwards from the last rib, as it filled the larger part of the left half of the body cavity. Together with the

above-mentioned own dislocation in PDD cases, *proventriculus gastris* engages other organs from the GL tract, such as the muscular part of the stomach, duodenum, ileum, and the liver, causing deviations from their normal gross anatomy.

**26.** D. Vladova, **R. Dimitrov**, D. Kostov, K. Stamatova-Yovcheva, D. Yovchev, M. Stefanov, 2017. SEM: Microvascular corrosion casting of the feline myocardium. Bulgarian Journal of Veterinary Medicine, 20, Suppl. 1: 50-56.

Scanning electron microscopy of corrosion vascular casts of the heart allows morphological and anatomical three dimensional observations and description of the distribution, diameter and internal surface of the collected replicas. Polymerised vascular casts with following corrosion of the heart have been obtained from cadavers of 6 sexually mature male cats (*Felis silvestris catus*). The obtained microvasculature replicas have been studied by SEM. In the atrial myocardium of the feline heart, the capillaries are relatively S-like curved, equally distributed and form network-like structures with predominant Y-like anastomoses. In the ventricular myocardium the capillaries are grouped in bundles and form between themselves H- and Y-type anastomoses, as predominate these of H-type. This finding gives us to make a motivation, regarding the hemodynamics that the observed morphological features are extremely favourable to provide a steady and permanent blood flow, which itself favours the metabolic and gas exchange.

**27.** K. Stamatova-Yovcheva, **R. Dimitrov**, D. Yovchev, D. Vladova, Omer Gurkan Dilek, R. Mihaylov, 2018. Histological definition for the gray scale ultrasonography of the rabbit liver. Vet. Hekim. Der. Derg., 89, (1): 32-41.

The aim of the present study is to prove that the morphological and histological features of the rabbit liver are base for the creation of proper anatomical US image. For the purpose, we use 12 clinically healthy New White Zealand rabbits. In the histological study, we use the routine staining with Hematoxylin/Eosin. The US study was carried out with ultrasonic equipment for 2D visualization. The US image of the rabbit liver was produced by the different acoustic impedance of the tissues, which composed the organ. The variability of the grey and white nuances when observing the anatomical US image of the rabbit liver is produced by its histological features. It is not relative to the orientation of the transducer to the field of study. There was a variability of the US acoustics of the liver at the same intensity of the US wave. This is also owing to the histological features of the liver and biliary ducts. US visualization of the rabbit liver is because of the dispersion character of the echo-signal, generated by parenchyma, perivascular connective tissue and extrahepatic biliary ducts. The different acoustics of capsula fibrosa and liver parenchyma is related to the following US indices:



brightness and contrast, in accordance to the greywhite scale, a variety of the grey nuance and speed of the US wave. We present the following conclusion: The US morphological character of the studied organ is defined by its histological features. These histological features of the liver could be accepted as “Golden standard”, because they define the US anatomical visualization of the organ.

**28.** Saso Stojanovski, Blagica Trajanoska, Mimi Ristevski, Cvetanka Stojanovska, **R. Dimitrov**, K. Stamatova-Yovcheva, D. Yovchev, 2019. Isolation and characterization of bacteria that cause otitis externa in dog breeds Poodle, German shepherd, Dobermann and Labrador retriever in Bitola region. Science & Technologies, vol. IX, (4), Veterinary Medicine, Animal Studies.

For this examination, 15 samples were taken from different ages of dog breeds: Poodle, German Shepherd, Dobermann and Labrador Retriever, from the changed ear canal. The samples were taken in the Bitola region for the period from January 2016 to April 2018. Totally 15 strains were isolated and identified based on their growth, colony morphology, Gram stain, catalase and oxidase activity using standard protocols. From the results obtained, it can be concluded that the most common bacteria that cause otitis externa in dog from the above-mentioned races are: *Pseudomonas* spp, *Proteus* spp and *Staphylococcus* spp, which further cause and additional complications in their state of health.

**29.** Saso Stojanovski, Cvetanka Stojanovska, Blagica Trajanoska, Pance Dameski, Natasa Pejcinovska, **R. Dimitrov**, K. Stamatova-Yovcheva, D. Yovchev, 2019. Isolation and characterization of bacteria that cause periodontitis in dog breeds Poodle, Pekingese in Bitola region. Science & Technologies, vol. IX, (4), Veterinary Medicine, Animal Studies.

In this study, 12 samples from clinical cause dog breeds: Poodle and Pekingese. The samples were taken in the Bitola region for the period from January 2015 to April 2017. Totally 12 strains were isolated and identified based on their growth, colony morphology, Gram stain, catalase and oxidase activity using standard protocols. From the results obtained, it can be concluded that the most common bacteria that cause periodontitis in dog from the above-mentioned races are: *Staphylococcus* spp, *Escherichia* spp and *Streptococcus* spp, which further cause and additional complications in their state of health.

**30.** Saso Stojanovski, Ivica Mitrevski, Blagica Trajanoska, Goce Cilev, Fejzula Fejzulah, **R. Dimitrov**, K. Stamatova-Yovcheva, D. Yovchev, 2019. Isolation and characterization of bacteria that cause tonsillitis in dog breeds English bulldog and German boxer in Bitola region. Science & Technologies, vol. IX, 2019, (4), Veterinary Medicine, Animal Studies.

In this study, 12 samples from clinical cases of dogs of breeds English Bulldog and German boxer in Bitola region for the period from January 2016 till April 2018. Totally 12 strains were isolated and identified based on their growth, colony morphology, Gram stain, catalase and oxidase activity using standard protocols. From the results obtained, it can be concluded that the most common bacteria that cause tonsillitis in dogs from the above-mentioned races are *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pasteruella* spp, *Klebsiella* spp.

**31.** K. Stamatova-Yovcheva, **R. Dimitrov**, Ömer Gurkan Dilek, D. Yovchev, 2021. Sagittal anatomic investigation of the rabbit liver. MAE Vet. Fak. Derg., 6, (1): 14-21.

The aim of the research was to study the topography of the liver and to image on computed tomography of the white New Zealand rabbit. We used ten rabbit cadavers. We obtained sagittal frozen cuts. At the level of the plane 10 mm to the left, the left medial lobe was cranial to the left lateral lobe. Caudally were the spleen, the left kidney and parts of the small and large intestines. At the level of the plane 20 mm to the left, the left lateral lobe touched caudally the stomach fundus and body, the papillary process was dorsal to the stomach fundus. At the level of the plane 10 mm to the right, the right lobe was cranially situated to the other lobes. Between the right lobe and caudate lobe were fundus and body of the stomach. Caudate process was caudal to the fundus of the stomach and dorsal to the cranial part of duodenum and ascending colon. It had anatomical contact with the right kidney. Papillary process covered the dorsal part of the stomach. At the level of the plane 20 mm to the right, the right lobe was cranial to the other lobes of the liver. The left medial lobe was covered partially by quadrate lobe. Gall bladder did not reach the ventral border of the liver. The left medial lobe was cranial to the body of the stomach. Caudate lobe touched the muscles of the spine.

**32.**

The anatomical features of the rabbit adrenal glands have been investigated in some aspects, either via classic anatomical methods and routine histology, either using imaging modalities in our previous experiments. The present study is focused for obtaining data, concerning the objective values of three macrometric indices – lateromedial, craniocaudal and dorsoventral diameters. We used the cadavers of thirty-four 8-month old (sexually mature) healthy white New Zealand rabbits weighing 2.8-3.2 kg. We reached the abdominal cavity after median incision. The both kidneys were kept in abdominal cavity with a view to find more easily the location of the right and left adrenal glands. The material was documented using a digital camera. The craniocaudal, dorsoventral and lateromedial diameters have been measured using a digital caliper, as the obtained values were accurate to the second sign. Descriptive analysis of the results using Statistica 8 - StatSoft DELL was performed. The lateromedial diameter of

the right adrenal gland was  $5.1 \text{ mm} \pm 1.0$ , craniocaudal diameter was  $9.3 \text{ mm} \pm 1.2$  and the dorsoventral diameter -  $5.0 \text{ mm} \pm 0.8$ . For the left adrenal gland were measured the following values - the lateromedial diameter was  $6.5 \text{ mm} \pm 1.2$ , the craniocaudal diameter was  $10.2 \text{ mm} \pm 1.4$  and the dorsoventral diameter was  $6.3 \text{ mm} \pm 0.9$ . Our results showed that the studied parameters of the left gland were with higher values compared to the right gland. The results from the conducted anatomical study deepens the knowledge for the macroscopic features of the rabbit adrenal glands.

20. 06. 2022 г.  
гр. Стара Загора

С уважение:.....  
(доц. д-р Росен Димитров)