ABSTRACTS
OF
ASSOC. PROF. DR. VASIL KOSTADINOV MANOV, PHD,

Presented for participation in a competition for academic position „Professor“, in the scientific field 6. Agricultural sciences and Veterinary medicine, professional field 6.4. Veterinary medicine, scientific specialty "Animal Pathology", in the discipline "Pathology (Special pathological anatomy)", published in a State Gazette №32/03.04.2020 and on the website of University of Forestry on 16.03.2020; Procedure code: VM-P-0320-35

I. Monographs

1. **Manov, V. Special veterinary pathology, PANEV Publishing, Sofia, 2020; ISBN 978-619-90789-4-5**

Abstract: The monograph reflects significant for veterinary practice pathological processes and morphological changes in some organs and organ systems in animals, using 73 literature sources. Some of the diseases are illustrated with 33 original photographs. The author's studies included in 52 scientific publications as well as case studies are included too..

2. **Manov, V. Morphological characteristics of some neoplasia in animals, PANEV Publishing, Sofia, 2020; ISBN 978-619-90789-3-8**

Abstract: The monograph presents data on some common cancers in animals. 161 sources were used, nine of which were from the author and thirty years of scientific and practical experience in this field. 54 original photographs illustrating various aspects of tumor morphology are presented. Some new data concerning some aspects of the etiology of neoplasia, their growth, evolution and morpho-functional characteristics have been interpreted. The most common animal tumors are systematised and morphologically characterised.

II. Scientific publications

1. **Simeonova, R., V. Vitcheva, M. Kondeva-Burdina, I. Krasteva, V. Manov, M. Mitcheva. Hepatoprotective and antioxidant effects of saponarin, isolated from *Gypsophila trichotoma* Wend. on paracetamol-induced liver damage in rats. *BioMed Research International*, 2013, Volume 2013 (2013), Article ID 757126, 10 pages.**

Abstract: The hepatoprotective potential of saponarin, isolated from *Gypsophila trichotoma*, was evaluated *in vitro/in vivo* using a hepatotoxicity model of paracetamol-induced liver injury. In freshly isolated rat hepatocytes, paracetamol (100 μmol) led to a significant decrease in cell viability, increased LDH leakage, decreased levels of cellular GSH, and elevated MDA quantity. Saponarin (60 – 0.006 μg/mL) pre-incubation, however, significantly ameliorated paracetamol-induced hepatotoxicity in a concentration dependent manner. The beneficial effect of saponarin was also observed *in vivo*. Rats were challenged with paracetamol alone (600 mg/kg, i.p.) and after 7-day pretreatment with saponarin (80 mg/kg, oral gavage). Paracetamol toxicity was evidenced by increase in MDA quantity and decrease in cell GSH levels and antioxidant defense system. No changes in phase I enzyme activities of AH and EMND and cytochrome P 450 quantity were detected. Saponarin pretreatment resulted in significant increase in cell antioxidant defense system and GSH levels and decrease in lipid peroxidation. The biochemical changes are

in good correlation with the histopathological data. Protective activity of saponarin was similar to the activity of positive control silymarin. On the basis of these results, it can be concluded that saponarin exerts antioxidant and hepatoprotective activity against paracetamol liver injury *in vitro/in vivo*.

2. **Simeonova, R., M. Kondeva-Burdina, V. Vitcheva, I. Krasteva, V. Manov, M. Mitcheva. Protective effects of saponarin from *Gypsophila trichotoma* on carbon tetrachloride-induced hepatotoxicity *in vitro/in vivo* in rats. *Phytomedicine*, 2014, 21 (2), 148-154.**

Abstract: This study investigated the hepatoprotective activity of saponarin, isolated from *Gypsophila trichotoma* Wend. using in vitro/in vivo hepatotoxicity model based on carbone tetrachloride (CCl_4)-induced liver damage in male Wistar rats. The effect of saponarin was compared with those of silymarin. In vitro experiments were carried out in primary isolated rat hepatocytes. Cell incubation with CCl_4 (86 mol l^{-1}) led to a significant decrease in cell viability, increased LDH leakage, decreased levels of cellular GSH and elevation in MDA quantity. Cell pre-incubation with saponarin (60 – 0.006 g/ml) significantly ameliorated CCl4-induced hepatic damage in a concentration-dependent manner. These results were supported by the following *in vivo* study. Along with decreased MDA quantity and increased level of cell protector GSH, seven day pre-treatment of rats with saponarin (80 mg/kg bw; p.o.) also prevented CCl_4 (10%, p.o.) - caused oxidative damage by increasing antioxidant enzyme activities (CAT, SOD, GST, GPx, GR). Biotransformation phase I enzymes were also assessed. Administered alone, saponarin decreased EMND and AH activities but not at the same extent as CCl_4 did. However, pre-treatment with saponarin significantly increased enzyme activities in comparison to CCl_4 only group. The observed biochemical changes were consistent with histopathological observations where the hepatoprotective effect of saponarin was comparative to the effects of the known hepatoprotecor silymarin. Our results suggest that saponarin, isolated from *Gypsophila trichotoma* Wend., showed in vitro and *in vivo* hepatoprotective and antioxidant activity against CCl_4-induced liver damage.

3. **Simeonova, R., V. Bratkov, M. Kondeva-Burdina, V. Vitcheva, V. Manov, I. Krasteva. Experimental liver protection of n-butanolic extract of *Astragalus monspessulanus* L. on carbon tetrachloride (CCl_4) model of toxicity in rat. *Redox Report*, 20(4), 2015, 145-153.**

Abstract: The objective is to investigate the hepatoprotective potential of n-butanolic extract of *Astragalus monspessulanus* L. (EAM) against *in vitro/in vivo* carbon tetrachloride (CCl_4)-induced liver damage in rats. Silymarin was used as a positive control. The *in-vitro* experiments were carried out in primary isolated rat hepatocytes first incubated with CCl_4 (86 μmol/l). Hepatic injury was discerned by a decrease in cell viability and cell glutathione (GSH) levels, an increase in lactated hydrogenase leakage into the medium, and an elevation in malondialdehyde (MDA) quantity. Cell pre-incubation with EAM (1 μg/ml and 10 μg/ml) significantly ameliorated the CCl_4-induced liver damage. *In vivo* rats were challenged orally with CCl_4 (10% solution in olive oil) alone and after 7 days pre-treatment with EAM (100mg/kg body weight per day, oral gavage). CCl_4 damage was judged by an increased production of MDA, depletion of cell GSH, and a decrease in cell antioxidant defense system. EAM pre-treatment normalizes the activities of the antioxidant enzymes and the levels of GSH and MDA. These data are supported by the histopathological examination. These results indicate that EAM has a similar significant

protective effect, *in vitro* and *in vivo*, against CCl_4 induced hepatotoxicity in rat as silymarin. This may be due to its antioxidant and membrane stabilizing properties.

4. **Filipov, C., C. Desario, O. Patouchas, P. Eftimov, G. Gruichev, V. Manov, G. Filipov, C. Buonavoglia, N. Decaro. A Ten-Year Molecular Survey on Parvoviruses Infecting Carnivores in Bulgaria. *Transbound. Emerg. Dis*. 2016, 63(4), 460-464.**

Abstract: Parvoviruses represent the most important infectious agents that are responsible for severe to fatal disease in carnivores. This study reports the results of a 10-year molecular survey conducted on carnivores in Bulgaria (n = 344), including 262 dogs and 19 cats with gastroenteritis, and 57 hunted wild carnivores. Real-time polymerase chain reaction (qPCR), followed by virus characterization by minor groove binder (MGB) probe assays, detected 216 parvovirus positive dogs with a predominance of canine parvovirus type 2a (CPV-2a, 79.17%) over CPV-2b (18.52%) and CPV-2c (2.31%). Rottweilers and German shepherds were the most frequent breeds among CPV-positive pedigree dogs (n = 96). Eighteen cats were found to shed parvoviruses in their faces, with most strains being characterized as FPLV (n = 17), although a single specimen tested positive for CPV-2a. Only two wild carnivores were parvovirus positive, a wolf (*Canis lupus*) and a red fox (*Vulpes vulpes*), both being infected by CPV-2a strains.

5. **Simeonova, R. L., V. B. Vitcheva, M. S. Kondeva-Burdina, G. S. Popov, A. M. Shkondrov, I. N. Krasteva, V. K. Manov. Evaluation of the antioxidant potential of defatted extract from *Astragalus spruneri* in spontaneously hypertensive rats (SHRs). *Bulgarian Chemical Communications*, 50, 2018, 105 –111.**

Abstract: The aim of this study was to evaluate the antioxidant potential of *Astragalus spruneri* (Fabaceae) in spontaneously hypertensive rats (SHR). Hypertension is a non-communicable disease and oxidative stress is regarded as one of the main pathophysiological mechanisms. Defatted extract of *A. spruneri* (EAS) was administered at a dose of 100 mg/kg bw (1/20 LD_{50}) for 14 days. At the end of the treatment period the animals were euthanized and the activities of catalase (CAT), superoxide dismutase (SOD) and glutathione peroxidase (GPx) as well as the levels of non-enzyme cell protector reduced glutathione (GSH) were assessed in the brain, liver, kidney and spleen of SHR. In comparison to normotensive Wistar rats, in control, non-treated SHRs the GSH level and the activity of GPx were decreased in all organs, while the activity of CAT and SOD was decreased in brain, liver and kidney, and unchanged in spleen. Compared to the control SHRs *A. spruneri* exerted antioxidant activity, discerned by statistically significant increased activities of CAT and SOD in liver and kidney, of GPx and GSH in liver, kidney and spleen. It is worth to be noted that the extract did not exert any effect in the brain. This might be due to the fact that it cannot penetrate the blood brain barrier. Based on the results of our study we could conclude that the lyophilized extract of *A. spruneri* showed antioxidant potential in spontaneously hypertensive rats – a model of essential hypertension in humans.

6. **Kril, A., A. Georgieva, B. Nikolov, R. Pepovich, K. Hristov, G. Stoimenov & V. Manov. In ovo hepatocarcinogenicity of N-nitrosodimethylamine and N-nitrosodimethylamine in White Leghorn chickens. *Journal of the Hellenic Veterinary Medical Society*, 2018, 69(3), 1117-1124.**

Abstract: Avian embryos have been gaining an increasing scientific interest as a valuable model system for the experimental cancer research that could contribute to a significant reduction of the number of laboratory animals. In the present study, the liver lesions induced by N-

nitrosodimethylamine and N-nitrosodiethylamine in 15I line, White Leghorn embryos were identified and studied by routine histopathological methods. Foci of altered hepatocytes with basophilic and eosinophilic phenotype, well known as preneoplastic alterations were identified in the avian embryonal livers after *in ovo* exposure to both N-nitroso compounds. These studies were further extended by histopathological, haematological and biochemical examinations on the effects of N-nitrosodimethylamine in chickens hatched from carcinogen-inoculated eggs. In addition to the preneoplastic lesions observed in the avian livers, proliferations of oval and hepatocellular carcinoma cells, with clearly expressed signs of malignancy were found. The *in ovo* application of the chemical carcinogen was found to affect both hematological and blood biochemistry parameters measured in experimental birds. The established conditions such as thrombocytopenia and increased levels of liver enzymes, as an essential part of the paraneoplastic syndrome, were associated with the process of hepatocarcinogenesis. The results of this study confirm the preneoplastic nature of the focal lesions in embryonal avian liver and their progression to liver neoplastic alterations after a single *in ovo* application of known hepatocarcinogens. Moreover, the results indicate that 15I line; White Leghorn embryos are a new, valuable *in ovo* model for studies on hepatocarcinogenicity of chemical compounds and underline the importance of research on the development of different avian models of carcinogenicity.

7. **Lyapina, M., V. Manov, M. Cekova. Contact sensitization to formaldehyde in veterinary medicine – an unexplored field in occupational health. *Indian Journal of Occupational and Environmental Medicine*, 2019, 23(1), 37-41.**

Abstract: Veterinary staff and students could be exposed to formaldehyde – a ubiquitous agent, common cause of contact allergy. The aim of this study to evaluate the incidence of contact sensitization to formaldehyde in exposures in veterinary medicine. A cross-sectional study was conducted during July–December 2017. A total of 206 individuals were included, patch tested with formaldehyde 1.0%/aq – 36 veterinary medicine students, 20 veterinarians, 47 students and 28 trainees of dental medicine, 41 dental professionals, and 35 non-occupationally exposed individuals. The incidence of contact sensitization to formaldehyde among the whole studied population was 48.1%, highest being among the students of veterinary medicine (94.4%) and the veterinarians (85%). With very high significance, the sensitization incidence was higher in the groups of students of veterinary medicine and veterinarians, if compared to the control group ($P < 0.001$); ($P = 0.004$), dental professionals ($P < 0.001$); ($P = 0.001$), trainees of dental medicine ($P < 0.001$); ($P = 0.005$), and students of dental medicine three-fourth year of education ($P < 0.001$); ($P = 0.001$). Significantly, higher was the incidence of contact allergy in the control group if compared to those of dental professionals ($P = 0.033$) and dental students three-fourth year of education ($P = 0.028$). The exposure to formaldehyde during the education in veterinary medicine and practice could be an important risk factor for the onset of contact sensitization. Stricter preventive measures are needed to reduce veterinary student's and lecturer's exposures. Equipment of dissection tables with local exhaust ventilation system could reduce the concentration of formaldehyde in the gross anatomy laboratory.

8. **Kondeva-Burdina, M., I. Krasteva, G. Popov, V. Manov. Neuroprotective and anti-oxidant activities of saponins' mixture from *Astragalus glycyphylloides* in a model of 6-hydroxydopamine-induced oxidative stress on isolated rat brain synaptosomes *Pharmacia*, 2019, 66(4), 233-236.**

Abstract: The aim of the study was to investigate the possible neuroprotective and antioxidant activity of purified saponins'mixture (PSM), isolated from *Astragalus glycyphylloides* (Fabaceae), in a model of 6-hydroxydipamine (6-OHDA)-induced oxidative stress on isolated rat brain synaptosomes. Synaptosomes were incubated with 3 different concentrations of PSM: 60 μg/mL; 6 μg/mL; 0.6 μg/ mL. The effects of PSM were compared to those of silymarin (S), at the same concentrations. The main parameters, characterized functional and metabolic status of synaptosomes, were investigated: viability (MTT-test) and level of reduced glutathione (GSH). At isolated rat brain synaptosomes, in conditions of 6-OHDA-induced oxidative stress (150 μM), PSM revealed statistically significant, concentration-dependent, neuroprotective and antioxidant effects, compared to those of silymarin. Effects were most prominent at concentration 60 μg/mL. These neuroprotective effects of PSM might be due to the possible activity as scavenger of reactive oxygen species (ROS), produced by p-quinone (toxic metabolite of 6-OHDA).

9. **Simeonova, R., V. Vitcheva, M. Kondeva-Burdina, G. Popov, A.Shkondrov, V. Manov, I. Krasteva. Alcesefoliside protects against oxidative brain injury in rats. *Brazilian Journal of Pharmacognosy*, 2019, 29(2), 221-227.**

Abstract: This study investigated the possible antioxidant and neuroprotective effects of alcesefoliside, isolated from *Astragalus monspessulanus* L., Fabaceae, against carbon tetrachloride (CCl_4)-induced brain injury in Wistar rats. Iron sulphate/ascorbic acid lipid peroxidation was induced in rat brain microsomes and pre-incubated with alcesefoliside and silybin. Male rats were treated *in vivo* with alcesefoliside and with silymarin alone; animals challenged with CCl_4; and pre-treated with alcesefoliside or silymarin in respective doses for 7 days, challenged with CCl4, followed by curative treatment (additional 14 days).The activity of acetylcholine esterase and the antioxidant enzymes: superoxide-dismutase, catalase, glutathione-peroxidase, glutathione reductase and glutathione-S-transferase as well as the biomarkers of oxidative stress malondialdehyde and reduced glutathione were measured. The alcesefoliside pre-treatment and consecutive curative treatment normalizes the activity of the antioxidant enzymes as well as levels of malondialdehyde and reduced glutathione. The observed effects on tissue level correlate with the histopathological observations of the brain. They were comparable to the effects of silymarin, used as a positive control. The results showed that alcesefoliside has a neuroprotective effect against CCl_4-induced brain toxicity in rats.

10. **Al Sharif M., V. Vitcheva, R. Simeonova, I. Krasteva, V. Manov, P. Alov, G. Popov, A. Shkondrov, I. Pajeva. *In silico* and *in vivo* studies of *Astragalus glycyphylloides* saponin(s) with relevance to metabolic syndrome modulation. *Food and Chemical Toxicology*, 2019, 130(20), 317-325.**

Abstract: Triterpenoids are well known modulators of metabolic syndrome. One of the suggested modes of action (MoAs) involves peroxisome proliferator-activated receptor gamma (PPARγ) binding. In this study we aimed to: (i) evaluate *in silico* potential metabolites and PPARγ-mediated MoA of the sapogenin of the main saponin present in a purified saponins' mixture (PSM) from *Astragalus glycyphylloides*; (ii) estimate *in silico* and *in vivo* PSM's toxicity; and (iii) investigate *in vivo* antihyperglycaemic, hypolipidaemic, antioxidant and hepatoprotective effects of PSM. Metabolites and toxicity were predicted using Meteor and Derek Nexus expert systems (Lhasa Limited) and PPARγ binding was investigated using the software MOE (CCG Inc.). PSM's acute oral toxicity was evaluated in mice and the pharmacological effects were assessed in streptozotocin-induced diabetic spontaneously

hypertensive rats (SHRs). Liver histopathology was studied as well. PPARγ weak partial agonist was predicted *in silico* for 24 probable/plausible Phase I metabolites which docking poses were clustered in 12 different binding modes with characteristic protein-ligand interactions. PSM's beneficial effects on the levels of blood glucose, triglycerides, and total cholesterol, on oxidative stress markers and liver histology in diabetic SHRs were comparable to those of the PPARγ ligand pioglitazone. PSM's safety profile was confirmed *in silico* and *in vivo*.

11. **Kondeva-Burdina M, Doytchinova I, Krasteva I, Manov V, Ionkova I. Hepato-, neuroprotective effects and QSAR studies on flavoalkaloids and flavonoids from *Astragalus monspessulanus.* *Biotechnology & Biotechnological Equipment*, 2019, 33(1), 1434-1443.**

Abstract: This study investigated the possible hepato- and neuroprotective effects of flavoalkaloids and flavonoids isolated from *Astragalus monspessulanus ssp. monspessulanus* and ssp. illyricus. Rat hepatocytes obtained by in situ two-stepp collagenase perfusion, and rat brain synaptosomes obtained by multiple centrifugation and Percoll gradient were used. Administered alone, on hepatocytes, all of the compounds increased statistically significantly the lactate dehydrogenase (LDH) activity and malondialdehyde (MDA) production and decreased the reduced glutathione (GSH) level, compared to the control (non-treated hepatocytes). Some of the compounds (1–7) had lower toxicity on the exam parameters than silybin. The main structural features accounting for the lower hepatotoxicity (evaluated by quantitative structure–activity relationship (QSAR) studies) are the increased number of hexoses and the number of aromatic OH groups. On the two in vitro toxicity models, all the 13 compounds had statistically significant hepato- and neuroprotective activities. They preserved the hepatocyte and synaptosome viability, as well as the GSH level and decreased the LDH leakage and MDA production. On isolated rat hepatocytes, in *tert*-butyl hydroperoxide- and on isolated rat synaptosomes, in 6-OH-dopamine-induced oxidative stress, flavoalkaloids and flavonoids isolated from *A. monspessulanus ssp. monspessulanus* and ssp. illyricus, were effective hepato- and neuroprotectors, as well as antioxidants. The observed higher hepato- and neuroprotective effects of 1, 2, 4, 7 and eight may be assigned to the different substituents present in either the aglycone or the sugar moieties.

12. **Chakuleska, L., R. Michailova, A. Shkondrov, V. Manov, N. Zlateva-Panayotova, G. Marinov, R. Petrova, M. Atanasova, I. Krasteva, N. Danchev, I. Doychinova, R. Simeonova. Bone protective effects of purified extract from Ruscus aculeatus on ovariectomy-induced osteoporosis in rats. *Food and Chemical Toxicology*, 2019, 132, 110668.**

Abstract: *Ruscus aculeatus* is a source of steroidal saponins that could mimic sex hormones and could help alleviate the risk of fracture in osteoporotic patients. The aim of the present study was to evaluate the *in vitro* effects of an extract from *R. aculeatus* (ERA) on the proliferation of human osteoblast-like SaOS-2 cell line and to investigate the effects of the ERA administered orally for 10 weeks at three doses (50, 100 and 200 mg/kg) on the bone structure of rats with estrogen deficiency induced by bilateral ovariectomy. Bone turnover markers, hormones, histopathological and radiological disturbances were evidenced in the ovariectomized rats. ERA recovered most of the affected parameters in a dose-dependent manner similar to diosgenin and alendronate used as positive comparators. The main active compounds of ERA (ruscogenin and neoruscogenin) were docked into the Vit. D receptor and oestrogen receptors alpha and beta, and

stable complexes were found with binding scores equal to those of estradiol and diosgenin. The findings of this study provide for the first time an insight into the effects of ERA on bone structure and suggest that ERA could be developed as a potential candidate for the prevention of postmenopausal osteoporotic complications.

13. **Popov, G., A. Shkondrov, M. Kondeva-Burdina, V. Manov, I. Krasteva. Effect of a purified saponins' mixture from *Astragalus glycyphylloides* on rat hepatocytes", *Comptes rendus de l'Academie bulgare des Sciences*, 2019 – in press**

Abstract: The aim was to investigate the effects of a purified saponins' mixture (PSM) from *Astragalus glycyphylloides* on a model of *tert*-bytylhydroperoxide (*t*-BuOOH) induced oxidative stress in isolated rat hepatocytes. PSM was obtained after chromatographic separation and purification of a defatted extract from the aerial parts of the species. Hepatocytes were isolated from male Wistar rats using an optimised method. They were treated either with PSM alone or with PSM after *t*-BuOOH-induced oxidative stress both in three different concentrations. Parameters as cell viability, activity of lactate dehydrogenase enzyme, as well as levels of intracellular glutathione and malonedialdehyde were assessed. Significant antioxidant activity was observed compared to the positive control silymarin. The results obtained could serve as a basis for further investigation of the antioxidant and cytoprotective properties of PSM.

14. **Manov, V., V. Planski, G. Popov. Histological characteristics of folliculogenesis in murrah water buffaloes during the early postpubertal period. *Bulgarian Journal of Veterinary Medicine*, 2020, 23(1), 80–88.**

Abstract: A characteristic feature of water buffalo heifers is that they approach breeding maturity later than bovine heifers. From a physiological and endocrinological view, this is related to a later puberty, which affects the overall reproductive performance of water buffalo. The aim of this study was to highlight some morphological characteristics of the water buffalo (*Bubalus bubalis*) ovaries in the early post pubertal period. The results showed active ovaries of the examined specimens. Some of the follicles had no oocyte, but were with normal structure and physiological activity. Histology is a definitive method for examination of ovarian activity in water buffaloes. In some of the ovulating follicles the oocyte was absent during early puberty. The presence of corpora lutea confirmed the endocrine maturity of the hypothalamus-pituitary-gonadal endocrine axis in 11–14 months old heifers despite the absence of oocytes.

15. **Popov, G., M. Kondeva-Burdina, R. Simeonova, V. Manov, A. Shkondrov, I. Krasteva. Hepatoprotective and antioxidant effects of alcesefoliside from Astragalus monspessulanus" in its current form for publication. *Brazilian Journal of Pharmaceutical Sciences*, 2020 – in press**

Abstract: The hepatoprotective and antioxidant potential of alcesefoliside (AF), isolated from *Astragalus monspessulanus* was investigated. Iron sulphate/ascorbic acid (Fe2+/AA) lipid peroxidation was induced in rat liver microsomes and pre-incubated with AF and silybin. *In vivo* experiments were carried out on male Wistar rats, challenged orally with carbon tetrachloride (CCl4) alone and after pre-treatment and followed by curative treatment with AF. The activity of the serum enzymes, the antioxidant enzymes, together with reduced glutathione (GSH) levels and malonedialdehyde (MDA) quantity were measured. Microsomal incubation with Fe2+/AA increased MDA production. The pre-incubation with AF reduced the formation of MDA in a concentration dependent manner, comparable to silybin. These findings were supported by the *in*

vivo study where CCl4-induced liver damage was discerned by significant increase in serum enzymes and in MDA production as well as by GSH depletion and reduced antioxidant enzymes activity (in tissue homogenate). The AF pre-treatment and consecutive curative treatment normalizes the activity of the serum enzymes and antioxidant enzymes alike, as well as the levels of GSH and MDA. The observed effects were consistent with the histopathological observations and were comparable to those of silymarin. It was found that AF showed antioxidant activity both in *in vitro* and *in vivo*.

16. **Motovski, A., S. Pavlova, R. Petrova, V. Manov (2007). A case of mass manifestation of PDNS. *Veterinarna sbirka*, 9-10, 14-17.**

Abstract: In an industrial pig complex mass transmission of one of the forms of swine circulatory infection - dermal syndrome and nephropathy (PDNS), which can be kept between 40-70 kg it was found. The purpose of the study was is to identify clinical and morphological changes that are characteristic of clarity. Anorexia, depression, ataxia and paresis were observed. Macroscopically, black-violet patches were observed in the peripheral area and hind limbs, as is the case throughout the body. The kidneys were pale, with petechial hemorrhages in the cortical area. The lymph nodes were hemorrhagic and pneumonia occurs in the lungs. Histologically, vasculitis, dermatitis, and interstitial pneumonia were detected.

17. **Pavlov, D., K Genova, V. Manov, A. Filchev. Experimental infection of myxomitosis in rabbits. *Proceedings* of a Scientific conference „Tradition and Modernity in Veterinary Medicine", University of Forestry-Sofia, 2009, pp. 367-370. (ISSN 1313-4337)**

Abstract: Myxomatosis is an acute viral disease of domestic and wild rabbits, caused by double-stranded DNA virus of family Poxviride. An experiment in rabbits with Bulgarian field virus isolate was carried out. The clinical and pathological alterations associated with myxomatosis in skin and internal organs were traced.

18. **Popova, T., V. Manov, G. Cherneva, A. Kril. Foreign pneumonia in dog. *Proceedings* of a Scientific conference „Tradition and Modernity in Veterinary Medicine", University of Forestry-Sofia, 2010, pp. 276-282. (ISSN 1313-4337)**

Abstract: Rare case of foreign body pneumonia in dog was established. It was caused by aspirated awn, penetrated into the lungs through the trachea, which was created a gateway for propagation of microorganisms and development of purulent necrotic inflammations of the lungs with mortal exit. In the microbiological examination of material from the lungs of the patient after death combination of *Pseudomonas aeruginosa* and *Streptococcus pneumonia* was fixed, as well as single *Candida albicans*. The isolation of the same microorganisms from blood in the hearth too was an indicator for development of septicemia. The temporary success of therapy was due to inadvertent detection and elimination of the cause of the disease because of rare occurrence and difficult to diagnose such cases. The multiresistance to antimicrobial means of bacteria found was also important to brief success of the antibiotic therapy and recurrence of infection. For death contributed *Candida albicans* too, whose development had an immunosuppressive effect. For early detection and removal of foreign bodies in airways endoscopy is recommended, especially for hunting dogs.

19. **Nikolov, B., V. Manov, K. Hristov, J. Ananiev, R. Pepovich. A case of hepatocellular carcinoma in a dog. *Proceedings* of a Scientific conference „Tradition and Modernity in Veterinary Medicine", University of Forestry-Sofia -София, 2012, pp. 55-62. (ISSN 1313-4337)**

Abstract: During a clinical examination of a 6-year female dog, breed Caucasian Shepherd, was detected fever with deteriorated general condition, presence of a solid painful edema in the liver area and ascites. In the ultrasound performed in the abdominal cavity was visualized hepatomegalia with the presence of hyperechogenic prominating nodulations and accumulation of fluid. Haematology analysis was performed and diagnostic laparotomy was undertaken. Haemoperitoneum and the presence of neoplastic lesions in the liver and pancreas were established. Histological, immunehistochemical and cytological tests were taken.

20. **Jordanov, S., A. Dimitrova, R. Pepovich, V. Manov. Clinical signs, forms of manifestation and pathomorphological changes in swine circovirus disease (PCVD). *Proceedings* of a Scientific conference „Tradition and Modernity in Veterinary Medicine", University of Forestry-Sofia, 2012, pp. 231-240. (ISSN 1313-4337)**

Abstract: The etiological role of the swine circovirus type2 (PCV2) in the diseases in pigs was proven in 1997 year and now they are registrated worldwide. One part of the development of the disease was described as a Syndrome of the multi- systemic wasting post weaning of pigs (PMWS) in 1991 year in Canada. Later in 1993 year in the United Kingdom it was described and the Syndrome of the dermatitis and the nephropathy in pigs (PDNS). Besides there are reports for a connection of the PCV2 with the Respiratory disease complex in pigs (PRDC), with the gastroenteritis and some reproduction disorders. In our studies from 2003 to 2012 year it was found that except the described clinical signs and the pathologycal changes distinctive to the PMWS and PDNS, there are observed some other manifestations of the PCVD, which are not restricted only in the both syndromes and can be included to a new group "general or permanent signs" of the disease. On our opinion such signs are: raised body temperature, lymphadenitis, conjunctivitis with an edema around the eye, signs of respiratory disease, anorexia, apathy, anemia, icterus, hyperemia and cyanosis, abortion and birth of dead and unviable pigs, congenital tremor, wasting, kyphosis and high mortality.

21. **Manov, V., B. Aminkov, J. Ananiev, A. Kril, B. Nikolov, K. Aminkov. Clinical case: neuroendocrine tumor and closed pneumothorax in dancing brown Eurasian bear (URSUS ARCTOS ARCTOS). *Proceedings* of a Scientific conference „Tradition and Modernity in Veterinary Medicine", University of Forestry-Sofia, 2013, pp. 134-145. (ISSN 1313-4337)**

Abstract: Diagnostic imaging, pathomophological and immunohistochemical studies were carried out on dancing Eurasian brown bear with pulmonary and gastrointestinal symptoms. In ultrasonographic examination of the liver were revealed multiple non-homogeneous hyperechogenic masses. In CT studies was found closed left-sided pneumothorax and *hypodense* foci scattered in the lobes of the liver. Pathomorphological, except atelectasis in the lungs, were found numerous dense gray-white structures and hemodynamic disorders. There have been many prominent nodular lesions in the liver and thickening of the wall of the ileum and its adjacent mesentery. Histopathological examination revealed anthracosis, atelectasis, venous stasis, hemorrhages and mineral deposits in the lungs. In the liver and lungs were found outgrowths of neoplastic cells with a polygonal shape, bright cytoplasm and hyperchromatic nuclei forming

glandular structures, characteristic of neuroendocrine tumors. The immunohistochemically study confirms the diagnosis.

22. **Nikolov, B., A. Georgieva, V. Manov, A. Kril. *In ovo* tests for carcinogenicity, mutagenicity and embryotoxicity, *Scientific Works Series C. Veterinary Medicine* 60 (1), 2014, 72-80.**

Abstract: The significance of avian models for studying pathological processes including carcinogenesis, both from a chemical and from a biological viewpoint, has been already clearly demonstrated. The in ovo models appear to be the missing link between the in vitro and the in vivo experiments. This approach has considerable advantages: the tests are rapid, less expensive than animal experiments, less hazardous to the personnel, performing the experiments and they have reliable endpoints. Examples include preneoplastic liver lesions in embryonic avian livers in the In Ovo Carcinogenisity Assay (IOCA) and the induction of micronuclei in embryonic avian erythrocytes in hen's egg test for micronucleus induction (HET-MN). In addition, the use of avian embryos in embryotoxicity testing is discussed.

23. **Nikolov B., V. Manov, R. Pepovich, T. Mehmedov, K. Hristov, K. Genova E. Nikolova R. Petrova, A. Georgieva, A. Kril. Hematological and biochemical parameters during the early stages of N-nitrosodiethylamineinduced hepatocarcinogenesis in turkeys. *Scientific Works. Series C. Veterinary Medicine*, 60(1), 2015, 122-127.**

Abstract: Some haematological and biochemical parameters in turkeys, hatched from embryonated eggs inoculated with the proven hepatocarcinogen N-nitrosodiethylamine were studied. Histopathology confirmed the presence of clear-cell and basophilic foci of altered hepatocytes and hyperplasia of cholangiocytes. The application of the chemical carcinogen affected both haematological and biochemical parameters. The established conditions such as thrombocytopenia and increased levels of the major liver enzymes were associated with the process of malignancy. In addition, leukogram abnormalities (leukocytosis, lymphocytosis and neutropenia) as well as hypoproteinaemia, hypoalbuminaemia and hypoglycemia were also observed.

24. **Georgiev G. I., M. Stefanova, V. Manov (2015). Two types of portosystemic shunts of the dog - a clinical case, MedInform. *Journal of Medical and Dental Practice*, 2(2), 175-183. (ISSN: 2367-6795) DOI: 10.18044/MedInform.201631**

Abstract: Recently reports of research on vascular abnormalities in domestic animals have increased in the literature. With the expansion of diagnostic imaging methods more various malformations of the portal vein in dogs of different breed affiliation can be detected. In these cases, the liver is most often affected and clinical vascular anomalies are manifested with hepatic encephalopathy. They appear with nonspecific symptoms which are hard to differentiate from other disorders of the nervous and digestive system. The different types of portal shunts should be known and researched in dog`s veterinary practice. It is possible to visualize them by contrasting methods of imaging diagnostics, and it can be estimated whether they are operable.

25. **Nikolov, B., A. Georgieva, R. Pepovich, K. Hristov, T. Mehmedov, V. Manov, E. Nikolova, R. Petrova, I. Vladov, A. Kril. Hepatic preneoplasia induced by N-nitrosodimethylamine and N-nitrosodiethylamine in Japanese quail embryos.**

***Tradition and Modernity in Veterinary Medicine*, 1, 1(1), 2016, 21–25. (ISSN 2534-9333)**

Abstract: Toxic and carcinogenic effects induced *in ovo* by N-nitrosodimethylamine and N-nitrosodiethylamine in Japanese quail embryos were studied by histopathological methods. The obtained results indicate that both compounds induce preneoplastic hepatic alterations. The spectrum of macroscopic and microscopic lesions identified in carcinogen-treated embryos has been presented. The significance of avian embryos as an inexpensive and reliable model system for studies on hepatocarcinogenesis has been briefly discussed.

26. **Dimitrov, D., V. Manov, I. Ralchev, K. Hristov, G. Popov. Cytological characteristics of endometritis in dairy cattle. *Tradition and Modernity in Veterinary Medicine*, 1, 1(1), 2016, 27–32. (ISSN 2534-9333)**

Abstract: In the last decades, related to increased milk yield, the reproductive performance has rapidly decreased in dairy cows, especially in the Holstein breed. Although milk yield is negatively associated with reproductive performance, there are other additional factors which affect the fertility in dairy cattle, such as animal health condition, management and balanced rations. Additionally, physiologic dysfunctions, such as uterine infections, are elements which are responsible for decreased reproductive performance and fertility in dairy cattle. The objective of this study was to obtain a clear view over normal cell clusters in cow`s vagina and uterus, so
This information will be useful for comparison in future examination related to rapid cytology diagnosis. Neutrophils are the first and most significant inflammatory cell involved in endometritis, but are also foremost during normal uterine involution. The inflammatory cell response in cases of subclinical endometritis is widely believed to be quantifiably more severe than that associated with normal involution yet milder than clinical endometritis. Such cytological diagnostic approach is useful for both – normal and infected vagina/uterus with or without presence of discharge. Vaginoscopy is a rapid and simple technique for the diagnosis of purulent vaginal discharge. Clear mucus is normal, whereas purulent and foul-smelling discharge is indicative of disease. Other ways of detecting uterine discharge have been studied, including the gloved hand and the Metricheck device (Simcrotech, Hamilton, New Zealand). The results show clear relation between cytological positive diagnosis and affected condition of the reproductive function.

27. **Savova, T., J. Petkov, A. Dimitrova, R. Petrova, V. Manov, N. Lalkovski, S. Ivanova, S. Atanasova, D. Kazachka. The first case of paratuberculosis in cattle in Bulgaria, proven by modern diagnostic methods. *Животновъдни науки*, 53(3-6), 2016, 172-178**.

Abstract: Paratuberculosis is chronic granulomatous enteritis with vaguely clinical signs. Diagnosis of the disease is very difficult and long due to the lack of uniform diagnostic methods that can be used to detect both forms of infection – clinical and subclinical. The discovery of subclinical infected animals is essential for disease control on farms nationally and internationally. The official veterinary medical statistics in Bulgaria lacks accurate data on the
Prevalence of the disease in animals because of it clinical manifestation. By using modern methods it was demonstrated persistence of the infection in wild ruminants in Bulgaria. The question of transmission of the agent between wild and domestic ruminants sharpen our attention for further research. A year ago it was reported cases of paratuberculosis in cattle from Northeastern Bulgaria. The disease was established based on history, clinical- morphological

manifestations, histological and microscopic examination. This year, a case of paratuberculosis was described by us of cattle in western Bulgaria. Identified and described were pathoanatomical lesions of paratuberculosis. The microscopic examination of the pathologically changed small intestines was observed typical mycobacteria. In a normal PCR it was demonstrated the presence of DNA from *M. avium, ssp. paratuberculosis.*

28. **Georgiev, G.I., L. Hristakiev, N. Mehandzhiyski, C. Filipov, I. Raychev, G.D. Georgiev, G. Popov, I. Ruzhanova, V. Manov, B. Aminkov. Radiological studies of secondary complicated sinusitis in a racing mare-case report. *Tradition and Modernity in Veterinary Medicine*, 2, 1(2), 2017, 75–82. (ISSN 2534-9333)**

Abstract: The purpose of this research reflects the development process of secondary sinusitis in horses regarding the topographic-anatomical preconditions for unilateral involvement of the all six sinuses complex. The medical anamnesis and diagnostic imaging tests conducted previously in a veterinary clinic in Germany were used. The head of the mare was examined by X-ray radiography and computed tomography (CT) methods after its death. The following procedure included a treatment of the skull and the established osteolytic alterations have been compared by us with those obtained from the X-ray images and CT scans, as well as the applied CT slices and 3D reconstructions of the alive patient. This prominent clinical case reveals an opportunity for an interpretation of the expansion and complications of sinusitis in horses with an emphasis on the anatomical characteristics of the sinuses, visualized by diagnostic imaging methods. Through this study we hope to contribute to the timely diagnosis and treatment of the paranasal sinuses inflammation in horses.

29. **Nikolov B., V. Manov, R. Pepovich, T. Mehmedov, K. Hristov, K. Genova, E. Nikolova R. Petrova, A. Georgieva, A. Kril. Hematological and blood-biochemical parameters of guinea fowls in early stage of N-nitrosodiethylamine-induced hepatocarcinogenesis. *Tradition and Modernity in Veterinary Medicine,* 2, 1(3), 2017, 27-32. (ISSN 2534-9333)**

Abstract: *In ovo* models (avian embryos) are a novel alternative to laboratory animals used in the experimental cancer research. In the present study, the preneoplastic liver lesions induced by N-nitrosodiethylamine in guinea fowls were examined by histopatological methods. The alterations of some hematological and biochemical parameters were examined in guinea fowls hatched from carcinogen-inoculated eggs. Histopathology confirmed the presence of basophilic and eosinophilic foci of altered hepatocytes, strongly resembling the morphology of the preneoplastic lesions previously found in other avian species and laboratory rodents treated with the same carcinogen, as well as in humans with hepatocellular carcinomas. In addition to the focal hepatic lesions, pronounced hyperplasia of cholangiocytes and *spongiosis hepatis* were also detected in treated guinea fowls. The established alterations of hematological and biochemical parameters included thrombocytopenia and an increase of the levels of major liver enzymes and were related to the hepatocarcinogenesis. In addition, changes in the leukogram (leukocytosis, lymphocytosis and granulocytosis), as well as hypoproteinemia, hypoalbuminemia and hypoglycemia were observed.

30. **Popova, T., V. Manov. *Clostridium botulinum* in peat litter – cause of deadly disease in reptiles private terrarium. *Tradition and Modernity in Veterinary Medicine*, 3, 1(4), 2018, 15-20. (ISSN 2534-9333)**

Abstract: Materials from 6 months old snakes of the species shooter snake (Coluber caspius), died with neurological symptoms and uncharacteristic eating of peat litter, and were tested. At the microscopic examination of samples of liver and peat litter were found bacteria with morphology, typical of *Clostridium botulinum*, then this species was isolated from studied materials. The clinical, pathological and microbiological results show that the most likely cause of these symptoms and mortality was botulinum intoxication. To prevent the disease, the peat and other bedding for reptiles should not be kept in wet and anaerobic conditions.

31. **Manov**, **V. Pathomorphological studies in newborn pigs induced by infection with vaccinal strain MK 35GE$^-$ and field isolates Mogila and St. Zagora of Suid herpesvirus 1. Part I. Nervous system. *Tradition and Modernity in Veterinary Medicine*, 3, 2018, 2(5), 21-27.**

Abstract: The great sensitivity of carnivorous animals to the Aujeszky's disease virus makes them an indicator of the presence or absence of the causative agent on a farm. The massive spread of rodents and especially cats, from porcine industrial farms with reproductive disorders, is the reason to investigate the clinical manifestations and pathomorphological changes induced by the vaccine strain and two terrain uterotropic strains of the Aujeszky's disease virus in dogs and cats. Kittens of 50–60 and dogs at 35–40 days of age were used. It was found that strain Mogila was highly virulent for dogs and cats, and the vaccine strain was more pathogenic for dogs and less pathogenic for cats. Cats had no itching. Pathohistological changes were localised in the nervous and respiratory system. They have the character of nonsuppurative encephalitis and interstitial pneumonia. In the lungs of cats, infected with strain Mogila, a fibrinous-necrotizing inflammatory response was observed.

32. **Manov**, **V. Comparative pathomorphological analysis of changes in dogs and cats, caused by the inoculation of a vaccine strain and field isolates of the Aujeszky's disease virus. *Tradition and Modernity in Veterinary Medicine*, 3, 2018, 2(5), 15-20.**

Abstract: The purpose of the present study was to perform a comparative morphological analysis of the changes in the central nervous system of new-born pigs prior to colostrum intake. The infection was artificially created by application of a vaccine strain MK 35gE- and two strains, isolated from intrauterine infection cases – Mogila and Stara Zagora II. A restriction profile of the viral strains was made. No neurological signs or 100% mortality were registered in the pigs that were infected with the strains St. Zagora II and MK 35gE-. Pathohistological changes caused by these two strains of the virus in animals CNS were similar and were characterized primarily by reproductive problems. The pathological changes induced by Mogila strain were obvious by presence of alteration, exudation, and proliferation (less pronounced) in the brain.

33. **Popov G., M. Kondeva-Burdina, V. Manov, A. Shkondrov, I. Krasteva. Effect of a purified saponins' mixture from *Astragalus glycyphylloides*, administered alone, on isolated rat brain synaptosomes and hepatocytes. *Tradition and Modernity in Veterinary Medicine*, 3, 2018, 2(5), 43-49.**

Abstract: Purified saponins' mixture (PSM), obtained from *Astragalus glycyphylloides* (family Fabaceae) was examined for possible toxic effects on isolated rat brain synaptosomes and hepatocytes when administered alone. Synaptosomes and hepatocytes were incubated with PSM at three different concentrations: 60 μg/ml; 6 μg/ml; 0.6 μg/ml. The effects of PSM were

compared to those of silymarin, in the same concentrations. The main parameters, characterizing functional and metabolic status of synaptosomes and hepatocytes were investigated: viability (by Trypan blue – for hepatocytes and MTT-test – for synaptosomes), lactate dehydrogenase activity (LDH), level of reduced glutathione (GSH) and production of malondialdehyde (MDA). It was found that administered alone the PSM did not reveal any statistically significant toxic effects on both isolated rat brain synaptosomes and hepatocytes, compared to silymarin.

34. **Manov, V. Pathomorphological changes in newborn pigs induced by infection with vaccinal strain and field isolates of Suid herpesvirus 1. Part II. Respiratory system *Tradition and Modernity in Veterinary Medicine*, 4, 2019, 1(6), 14-19.**

Abstract: Comparative pathomorphological studies of newborn piglets prior to colostrum intake after infection with a vaccine strain and two uterothropic strains of the Aujeszky's disease strains – Mogila and Zagora II were performed. The studies were conducted with 21 large, well-developed piglets derived from an industrial pig farm, without antibodies to Suid herpesvirus 1. Histological, histochemical and electron microscopic studies have been performed. It was found that strains of the Aujeszky's disease, which differ in virulence and tissue tropism, caused different severity, characteristic clinical signs and pathomorphologic changes in experimental animals. The clinical signs are related to changes in the respiratory and digestive systems, bedsores and apathy. In the lungs of the pigs, infected with strain St. Zagora II and strain MK 35gE-, atelectatic and proliferative changes were observed. Serous – fibrinous pleuritis, fibrinogen necrotic pneumonia and the presence of inclusions type Cowdry A in the epithelial and connective tissue in lungs of the tested animals were inspected.

35. **Popova, T., V. Manov. Atypical pneumonia in cows after transportion. *Tradition and Modernity in Veterinary Medicine*, 4, 2019, 2(7), 26-33.**

Abstract: Atypical pneumonia was proved in cetacean cows which died in the village of Boeritsa near Ihtiman after import from Austria. Fibrinous-purulent changes were detected both in lungs and pleura. Pathological anatomical findings were characteristic of pasteurellosis, but no *Pasteurella* bacteria were identified. *Serratia marcescens* and small amounts of *Staphylococcus xylosus, Streptococcus pneumoniae, Enterococcus faecalis* and *Candida albicans* were isolated after the microbiological examination of the material from the lungs. Antibiotic poly-resistance was detected in vitro. This indicated that they are most likely selected in the animals after frequent treatment with such agents by almost all groups to suppress conditionally pathogenic infections, possibly due to hygiene weaknesses in breeding and feeding in the farm they had inhabited prior to their import into Bulgaria. The stress during the long transportation and adaptation to the new living conditions is a prerequisite for their multiplication, which in vivo is accompanied by an increased virulence and development of fatal pneumonia.

36. **Stamberov, P., T. Todorov, B. Nikolov, G. Manova, V. Manov. Fatal European yew *(TAXUS BACCATA)* poisoning in two horses. *Tradition and Modernity in Veterinary Medicine, ***, 4, 2019, 2(7), 34-39.**

Abstract: A clinical case of European yew tree poisoning in two geldings in a mountain ranch for adventure riding is described. According to the owner, the horses have become suddenly ill. A more detailed history revealed that horses have eaten twigs and needles of coniferous tree, located in the immediate vicinity of a paddock. Prior to death nervousness, incoordination, muscle trembling, difficulty breathing, weakness and convulsions were observed. At necropsy

the most prominent gross lesions include the presence of partially clotted blood, lung edema, cardiac dilatation and hyperemia of the stomach and small intestinal mucosa. In gastric content the presence of partially digested twigs and large number of needles of European yew was identified.

37. **Jordanov, S. A. Dimitrova, V. Manov, K. Hristov. Differential-diagnostic scheme of the clinical signs and the microscopic changes in infectious abortions and dead births in swine. *Ветеринарна сбирка*, 28, 2018, 5-6, 28-33.**

Abstract: In the scientific reports it is generalized analysed and classified, in a suitable form for the veterinary doctors in the practice, differential-diagnostic scheme of the established important clinical sighs and phatological changes in the sow, the placenta and the fetuses, caused by the infectious diseases. In the differential-diagnostic scheme there are included as well as viral diseases (Classical swine fever, Aujeszky's disease, porcine reproductive and respiratory syndrome and parvovirus), and also well a number of bacterial diseases such as brucellosis, leptospirosis, listeriosis and chlamydiosis. Marked of differences in the moment of abortion or dead births, clinical characteristics, macroscopic changes and appropriate materials and methods for laboratory diagnosis.

III. Books and manuals

Books

1. **Manov, V. General veterinary pathology. Book for students of veterinary medicine. PANEV Publishing, Sofia, 2018; ISBN 978-619-90789-2-1**

Abstract: This book is in accordance with the curriculum of the discipline General Pathomorphology, approved by the Rector of the University of Forestry, Sofia. The general pathomorphological processes such as abnormal accumulations, necrotic changes, circulatory disorders, regenerative-adaptive and adaptive processes, inflammation, neoplasia, malformations and others occurring under certain circumstances in the human and animal body are considered. The morphological picture of the changes in these processes and states is plausibly recreated.

2. **Manov, V. Pathoanatomical characteristics of diseases in domestic animals. Book for students of veterinary medicine. PANEV Publishing, Sofia, 2020; ISBN 978-619-90789-5-2**

Abstract: The book is intended for students of veterinary medicine from the University of Forestry-Sofia, as well as for practicing veterinary doctors. Diseases significant for veterinary practice are considered. Data concerning the etiology, general epizootological, phtogenetic and clinical aspects of the manifestation of these diseases are reflected. Emphasis is placed on the true reflection of the macroscopic changes of the specific nosological unit and the main histological changes. Commonly used laboratory methods for making definitive diagnosis are presented/ Differential-diagnosis variants for comparison between the diseases are considered.

Manuals

1. **Stoikov, D., I. Nikiforov, S. Stoev, I. Dinev, V. Manov, N. Grozeva, R. Simeonov, R. Todorov, J. Iordanov. Veterinary autopsy equipment and incinerator affairs.Tutorial Manual, Stara Zagora, 2007; ISBN: 978-954-9383-24-9.**
2. **Stoev, S., I. Dinev, V. Manov, R. Simeonov, N. Grozeva. Veterinary autopsy equipment and incinerator affairs, Stara Zagora, 2016; ISBN: 945-9887-24-3.**

Abstract: The manuals are intended to acquaint students of veterinary medicine with the purpose of performing the pathological examination, its order and sequence, used tools, safety measures, etc. The method of taking, processing and sending materials for additional laboratory analysis, preparation of durable macroscopic preparations and writing of autopsy protocols is described. The methods for destruction of carcasses, as well as the device and the technological processes in the mortuaries are considered. The manuals are in accordance with the approved curricula in the discipline "Pathology" (Special Pathological Anatomy) of the Faculty of Veterinary Medicine at Trakia University-Stara Zagora and the Faculty of Veterinary Medicine at Forestry University-Sofia.

3. **Dinev, I., I. Nikiforov, S. Stoev, V. Manov, N. Grozeva, D. Pavlov, R. Todorov. Veterinary Histopathology. Tutorial Manual, Bogomilovo, 2012; ISBN: 978-934-9443-14-1.**
4. **Dinev, I., S. Stoev,, V. Manov, N. R. Simeonov, N. Grozeva, Kalkanov, K. Dimitrov, G. Popov. Veterinary Histopathology. Tutorial Manual, Bogomilovo, 2016; ISBN: 978-954-9443-38-3.**
5. **Dinev, I., S. Stoev, V. Manov, R. Simeonov, N. Grozeva, I. Kalkanov, K. Dimitrov, G. Popov. Veterinary Histopathology. Tutorial Manual, Bogomilovo, 2016; ISBN: 978-954-9483-38-3.**

Abstract: The manuals (in Bulgarian and English) are designed to facilitate veterinary students in the study of microscopic changes occurring in the animal body in various pathological conditions. Its allow the performance of individual work, the development of creative thinking and tracking of the studied material, in accordance with the curricula of "Pathology (General Pathomorphology) and Pathology (Special Pathological Anatomy)" studied in the Veterinary faculties in the country.

Candidate:
(Assoc. prof. Dr. Vasil Manov, PhD)