

The Lesion

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Chief Editor

Dr R. Somvanshi

Editor

Dr K.P. Singh

From IAVP Archives



First IAVP Fellow: Dr M.Y. Mangrulkar, MSc, MRCVS, DTVM was founder Principal (1947-1964) of Central Province and Barar Veterinary College, Jabalpur. He was an eminent Veterinary Pathologist and Educationist.

Special Editorial ...

Beginning of Birth Centenary Year of Karm Yogi Dr C.M. Singh



Second IAVP Fellow Dr C.M. Singh, was born in a remote village in Distt. Jaunpur (UP) on 30th November, 1922. He obtained BVSc degree from Bihar Veterinary College, Patna and MS, PhD from MSU, East Lansing, USA. Dr C.M. Singh was an eminent Veterinary Pathologist and Microbiologist and has made outstanding contributions in understanding animal diseases mainly listeriosis, salmonellosis, mycoplasmosis, bovine lymphosarcoma and slow viral respiratory diseases. He was an excellent teacher and researcher. Later, when he joined as Dean at Haryana Agricultural University, Hisar and Director, Indian Veterinary Research Institute, Izatnagar, Bareilly, UP he proved himself as an able administrator and distinguished veterinary educationist. His vision and thoughtful plans converted post-independent IVRI of 5 Divisions into 21 Divisions of National Institute of International fame. Due to enormous extension of research infrastructure during Five Year Plans to meet the need of farmers and industry, IVRI, Bangalore Campus was developed for Foot and Mouth Disease vaccine R&D. High Security Animal Disease Laboratory at Bhopal (now NIHSAD) was an institution of his visionary planning, is presently engaged in diagnosis of a number of infectious exotic diseases including bird flu. From IVRI, four separate ICAR research Institutes namely Central Avian Research Institute, Izatnagar, UP, Central Institute for Research on Goats, Makhdoom, Mathura, UP, National Institute of High Security Animal Diseases, Bhopal, MP and Directorate of Foot and Mouth Diseases, Bhubaneswar, MP were developed for poultry and goat production and animal disease diagnosis. His significant contribution in development of Department of Pathology and Bacteriology at Veterinary College, Mathura and IVRI as a whole is a true testimony to his dynamic stewardship. IVRI is known as Mecca for Veterinarians, owing to its uniqueness in integrating research, disease investigation, extension, technology development and teaching. After superannuating, he did not sit idly. He felt the need to reform the Veterinary Education in this country and was instrumental in creation of Veterinary Council of India and National Academy of Veterinary Sciences. He was Founder President of these two prestigious national organizations. Dr C.M. Singh had collaboration and interaction with international agencies like-FAO, WHO, UNDP, SIDA, DANIDA, etc. He attended a number of international seminars and symposia on epidemiology and zoonotic diseases in different parts of the world. He guided several eminent veterinarians for their masters and doctoral programmes in the disciplines of Pathology, Bacteriology and Virology. As a person, Dr Singh was simple, honest and hardworking with no time for personal comfort and family affairs. IAVP awarded its Fellowship to him and initiated its first award "Dr C.M. Singh Best Research Paper Award" as early as in 1980s. He was a great visionary. Some people called him, "Doyen of Veterinary Profession", while others considered him as "bhishmpitamah" or "purushottam" and "preranashrot". During his last visit to this IVRI on 10th January, 2005, scientists of twin Institutes at Izatnagar had the opportunity to listen and meet him. He is still remembered for his talk on philosophy of life interspersed with verses of the Holy Gita. Dr Singh left his world for his heavenly abode journey on 27th July 2005 in UK after a prolonged illness. His dream to establish Indian Council of Veterinary Research is still not fulfilled. It will be best homage to him, if we can achieve this objective for betterment of veterinary profession. A number of Veterinarians of country celebrating his birthday 30th November as Veterinary Doctors Day. Dr C.M. Singh Endowment Trust, Bareilly, UP has launched a yearlong Dr C.M. Singh Birth Centenary Year Programme which began on 30-11-2021 at DUVASU, Mathura, UP. Let us remember "Karm Yogi" and our young generation should take some inspiration from his life and work.

IVPC 2021

Welcome to IAVP International Veterinary Pathology Congress, 2021 at RAJUVAS, Bikaner, Rajasthan

XXXVIII Annual Conference of Indian Association of Veterinary Pathologists and XII Annual Meeting of Indian College of Veterinary Pathologists and International Symposium on “Advances in Veterinary Pathology for Diagnosis and Control of Emerging and Re-emerging Diseases of Livestock, Wild Animals and Poultry” is being jointly Organized by Department of Veterinary Pathology, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner; Indian Association of Veterinary Pathologists and Indian College of Veterinary Pathologists on 17 to 19 December, 2021 in hybrid mode. The Veterinary Pathology Congress, 2021 will bring under one umbrella the Veterinary Pathologists, Disease diagnosticians, students and scientists from other fields of sciences to share research findings, ideas and intellectually explore the scope of Veterinary Pathology in the field of one health, food security and environmental protection. RAJUVAS, Bikaner was established on the 13 May 2010. The University is located in heritage and palatial buildings of erstwhile Ganga Avenue housing the College of Veterinary and Animal Science, Bikaner since 1954 and its precincts, spreading over 200 acres of land. The University has sophisticated equipment's and well-equipped facilities for the execution of the Teaching, Research and Extension activities. The University covers entire Rajasthan state with 30 institutions including 5 Veterinary Colleges (in which 2 are just sanctioned), 9 Livestock Research Station (LRS) and 16 Pashu Vigyan Kendra (PVK). The University is also pursuing its effort to execute state specific research through state sponsored centers of advance research for benefits of livestock owners, students and researchers under dynamic leadership of Dr S.K. Garg, new Vice Chancellor.



Dr S.K. Garg
Vice Chancellor, RAJUVAS

Meet Your Organizing Secretary

Dr Hemant Dadhich, Director of Research, RAJUVAS, Bikaner, Rajasthan is Organizing Secretary of VPC, 2021. He was born in Bikaner, Rajasthan on 9th March 1966. He obtained BVSc& AH (1990), MVSc (1993) and PhD (1999) degrees in Veterinary Pathology from Rajasthan Agricultural University, Bikaner, Rajasthan. Dr Dadhich was selected Professor and Head, College of Veterinary and Animal Science, Bikaner in May 2011. He also served as Associate Professor and Head, College of Veterinary and Animal Science, Bikaner (2005-2011) and Associate Professor, Faculty of Veterinary Medicine, Addis Ababa University, Ethiopia under UNDP (2005-2006). He was Officer in-Charge (2001-2005), Senior Assistant Professor (2000-2005), Assistant Professor (1996-2005) and Instructor (1994-1996) in Department of Veterinary Pathology, College of Veterinary & Animal Science, Bikaner. Earlier he served as VAS in Department of Animal Husbandry, Rajasthan (1990-1994) and T-4 at National Research Centre on Camel, Bikaner, Rajasthan (1990). He guided a number of masters and doctoral students in discipline of Veterinary Pathology and presented and published 244 papers. He is recipient of University Scholarship for Post-graduation; IAVP Best Paper Award 1995, IAVP Savitri Sinha Award for Best Paper presentation in 1997, ISHEER Award of 1999, Republic Day Appreciation Award in 2002, Certificate of appreciation by RAJUVAS, Bikaner for organizing National Seminar in 2011. He is Fellow of Indian Society for Immunology and Immunopathology, National Academy of Veterinary Sciences (2013) and selected for award of IAVP Fellowship for year 2021. He may be contacted on Email ID: hdadhich@rediffmail.com



African swine fever outbreaks in pig population of Mizoram, India

African swine fever (ASF) is one of the most important and dangerous viral diseases of pigs, which can cause mortality up to 100%. The causative agent, African swine fever virus (ASFV) is a double-stranded DNA virus and is the only member of the family *Asfarviridae*, genus *Asfivirus*. ASFV is a complex enveloped virus with a large double-stranded DNA molecule that ranges in length between isolates from about 170 to 193 kbp (Dixon *et al.*, 2013, Salas and Andrés, 2013). The disease was first detected in Kenya in 1921 following the introduction of European domestic swine into the country and is now endemic in most of the sub-Saharan African countries (Montgomery, 1921). ASF first escaped from Africa in 1957 to Portugal via contaminated waste containing infected pig products that were used to feed pigs and then subsequently spread to other European countries. ASFV was introduced into the Georgian Republic through the port of Poti, potentially via improperly disposed waste from international ships carrying contaminated pork or pork products used to feed pigs (Beltran-Alcrudo *et al.*, 2008). In the following years it has spread to other Caucasian countries, Russia, Ukraine and Belarus (Gabriel *et al.*, 2011). In Southern East Asia, China has reported the first outbreak of ASF in 2018 from Shenbei district of Shenyang, Liaoning Province; following several ASF outbreaks in Siberia near to the Russia-China border in 2017. The first occurrence of African swine fever in domestic pigs in India was recorded from two states of north-east India, namely Arunachal Pradesh and Assam in early 2020. The possible source of ASF into Arunachal Pradesh and subsequently to Assam state of India was considered as through China (Rajukumar *et al.*, 2021).

Subsequently during the period from April to August 2021, undersign reported the first outbreak of ASF in pig population of Mizoram. The outbreak initially recorded from Aizawl district, which has rapidly spread to all the eleven districts of Mizoram. Affected pigs showed severe depression, high fever, bloody diarrhea and vomition in the affected farms. The detailed post mortem examination of pigs died of the disease revealed cutaneous hemorrhages, particularly in inguinal and scrotal area, inner thighs and ventral surface of the body. The hemorrhages on skin appeared either as circumscribed, red to black areas or diffuse reddish areas on skin. All the lymph nodes including inguinal, peri-renal, gastro-hepatic, bronchial and mesenteric lymph nodes were enlarged, hemorrhagic and dark red in color. The large intestine showed severe hemorrhagic enteritis. Petechial hemorrhages on cortical surface of kidney (Turkey egg kidney) were observed along with patches of ecchymotic hemorrhages. Spleen was swollen, markedly enlarged and dark bluish-black in color. Liver was congested, soft,



Figure 1 (A-D): Gross lesions in various organs in ASF affected pigs

enlarged with hemorrhages at the edges. Gall bladder was distended with hemorrhages on its wall. Severe hydropericardium, hemorrhagic myocarditis and endocarditis were observed in heart. Lungs were non-collapsing with focal areas of hemorrhages.

The outbreak was confirmed by detection of p72, p54 and the central variable region of B602L genes by PCR in representative tissue samples collected from dead pigs. The nucleotide and phylogenetic analyses of p72, p54 and B602L genes of ASFV from the field outbreaks in Mizoram was carried out along with the sequences available from rest of India. The analysis characterized the ASFV as genotype II (Fig2). Interestingly, the analysis of B602L gene has revealed that the ASFV from Mizoram state of India is more closely linked to the Eurasian ASFV strains isolated prior to 2014 and discriminated the Indian strains in two separate groups indicating that the source of origin for the Mizoram outbreak could be different from that of the other states of India.

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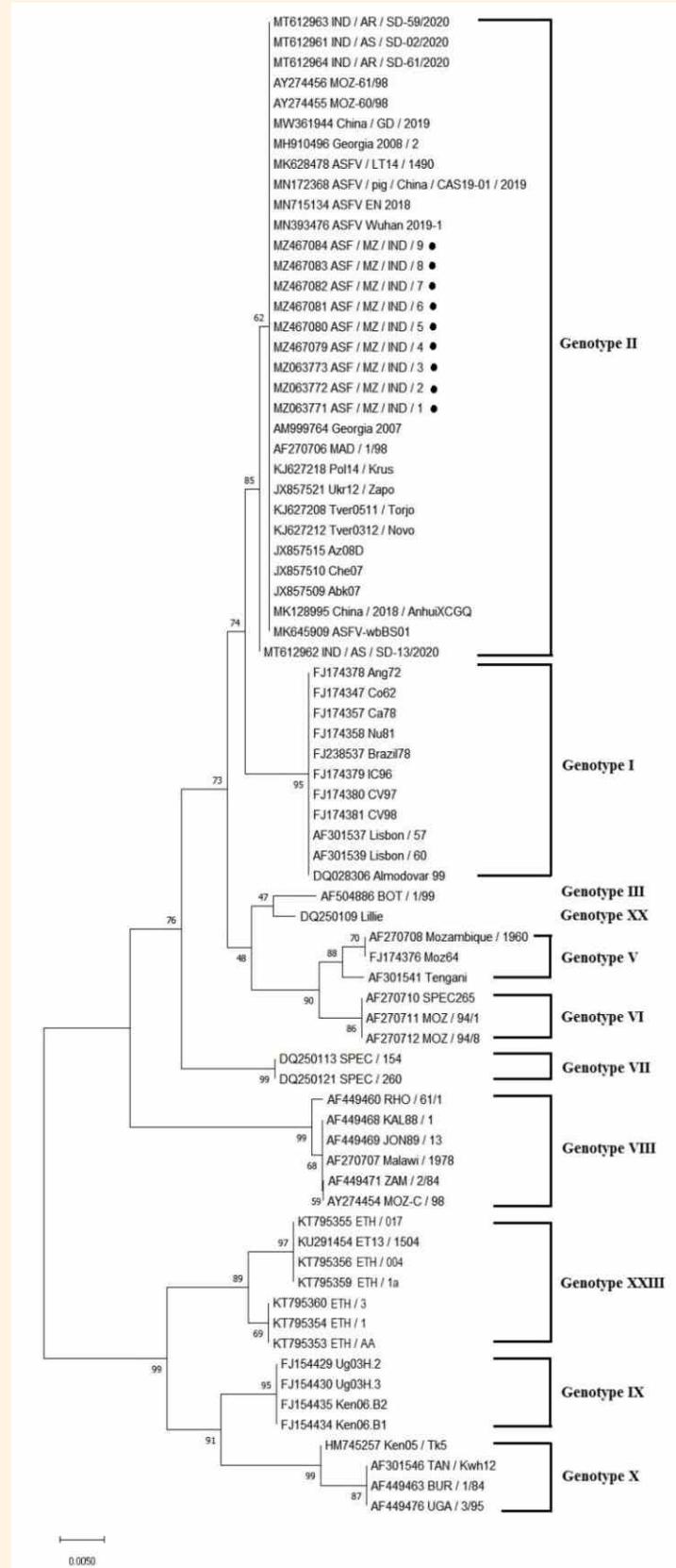


Figure 2: Phylogenetic tree analysis of p72 gene of ASFV, performed by MEGA X software. ASFV field isolates from this study are represented by black circle (●).

Emerging Disease

Lumpy skin disease (LSD) - An emerging viral disease of bovines in India: Worst nightmare for livestock farmers

Lumpy skin disease (LSD) is an emerging vector borne viral disease, caused by Lumpy skin disease virus (LSDV), a member of genus *Capripoxvirus* and family *Poxviridae*. It is a transboundary and notifiable disease to OIE. LSDV has rapid spread potential and threat as agro-terrorism, causing significant economic losses to livestock farmers. All ages and breeds of cattle and buffaloes are affected, but especially young, peak lactation and immune-compromised cattle are highly susceptible. Ticks, biting flies (*Culicoides spp.*) and mosquitoes are most common vectors responsible for the transmission of LSDV. Before 2019, LSD was considered as an exotic disease to India. In India, LSD suspected cases were first noticed in August, 2019 in West Bengal and Odisha states. Officially, first occurrence of LSD in India was reported to the OIE on 18th November, 2019. Subsequently, LSD was reported in various states including Tamil Nadu, Karnataka, Kerala, Andhra Pradesh, Telangana, Maharashtra, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Uttarakhand, Haryana, Rajasthan, Bihar, Punjab, Gujarat, Jharkhand, and Assam. In India, cattle are mainly affected with severe form of disease; whereas, mild to moderate infection but not as severe as in cattle was reported in buffaloes. Sheep and goats are resistant to infection, even when tethered in close proximity to infected cattle. In India, LSD caused high morbidity and very low mortality. Farmer from Wayanad district, Kerala said that he had lost Rs. 700/day due to reduced milk yield in cattle due to LSD infection. Clinical LSD is characterized by high fever, nasal discharge, watery eyes, enlarged superficial lymph nodes, mastitis, orchitis, eruption of generalized, firm, flat topped and circumscribed papules and nodules of variable sizes (0.5–5.0 cm size) all over the body including skin of head, buccal mucosa, neck, perineum, scrotum and udder.

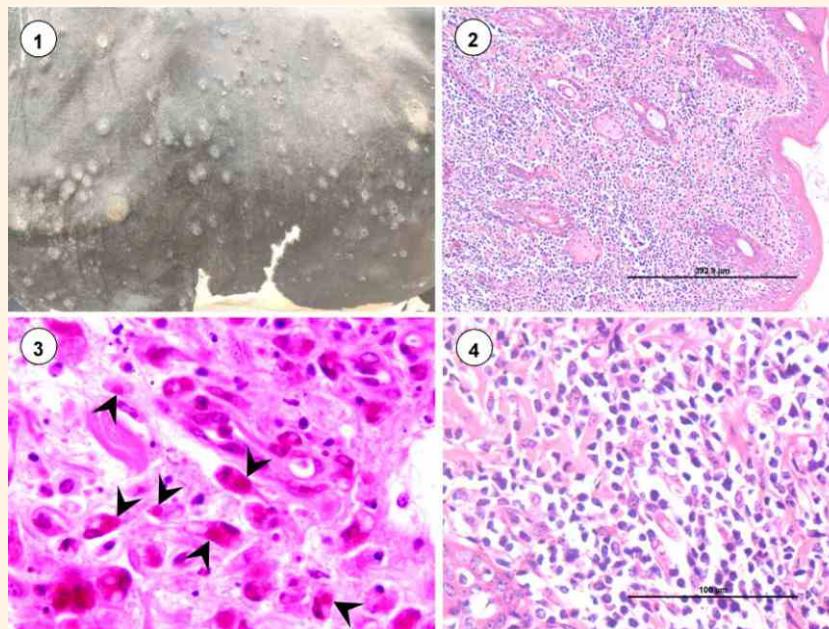


Figure. LSDV infection in cattle. **1.** Firm, flat topped and circumscribed papules and nodules of variable sizes all over the body. **2.** Skin showed severe infiltration of mononuclear cells especially dendritic cells, lymphocytes and histiocytes in dermis and hypodermis. H&E, x100. **3.** Skin showed eosinophilic intracytoplasmic inclusion bodies (arrowhead). H&E, x400. **4.** Higher magnification showed morphology of dendritic cells and histiocytes in dermis. H&E, x400.

Presently, no anti-viral drugs are available to treat LSD, antibiotics and anti-inflammatory drugs are used symptomatically. The only feasible solution to effectively control LSDV in India is to follow vaccination, vector control, strict quarantine measures, and restricted movement of livestock. Presently, in India, indigenously developed live-attenuated heterologous goat pox vaccine is used to control LSDV in cattle. Work is going on to develop LSDV live-attenuated homologous vaccine under the new ICAR-funded project “All India Network Programme on Challenging and Emerging Diseases of Animals (AINP-CEDA)”.

-M. Saminathan, M. Dinesh and K.P. Singh, Centre for Animal Disease Research and Diagnosis, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP

Case Report

Metaplastic canine mammary carcinoma with osteoclast-like giant cells: Warrants new subtype classification

Mammary carcinoma with stromal osteoclast-like multinucleated giant cells (OMGCs) is an extremely rare tumour and unusual component of the breast cancer. Presence of OMGCs in extra skeletal neoplasms of various organs has puzzled pathologists for many years due to the rarity of such cases. In humans, the tumour is classified as osteoclastic sarcoma or giant cell malignant fibrous histiocytoma or extra skeletal osteoclastoma of the breast. In women, OMGCs accounts for 0.5–1.2% of the breast cancer; however, there are several case reports of mammary carcinoma with OMGCs have been described. Like women, to the best of our knowledge, no separate case reports on canine mammary tumour (CMT) with OMGCs are available in the literature. Cotchin (1958) mentioned about multinucleated giant cells under osteo (chondro) sarcomas classification; however, no word mentioned about osteoclast-like (Mammary neoplasms of the bitch. *J. Comp. Pathol. Ther.*). Current widely used CMT classification neither mentioned multinucleated giant cells nor osteoclast-like throughout the article (Goldschmidt *et al.*, 2011).

In this communication, we report the histopathological features of four metaplastic CMTs with OMGCs. Grossly, these tumours are characterized by large oval mass with irregular borders, often ulcerated surfaces, small cystic cavities in center and very firm in consistency (Fig. 1). Fine-needle aspiration cytology (FNAC) showed numerous multinucleated giant cells along with malignant epithelial cell clusters and fibroblasts (Fig. 2). Histopathologically, most of them are tubulopapillary carcinoma along with osseous or chondral metaplasia (Fig. 3) with numerous OMGCs situated close to the osteoid matrix with resorption (Fig. 4). Sarcomatous stroma contained spindle shaped cells. The origin and nature of OMGCs is uncertain, significance of OMGCs in metaplastic mammary carcinoma, and the factors responsible for their development are still unknown due to the rarity of these neoplasms. Immunocytochemical (HLA-DR, Fc receptors, CD11, CD14, CD16, and CD18) and ultrastructural studies are helpful to prove the origin of OMGCs in extra-skeletal neoplasms. Most common origin is stromal histiocytic or mononuclear phagocyte system. This communication underlines the need of including CMTs with OMGCs as separate classification under malignant mesenchymal neoplasms of CMTs as “osteoclastic sarcoma” in future as that of human.

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- M. Saminathan, A.T. Faslu Rahman, M. Dinesh and K.P. Singh, Centre for Animal Disease Research and Diagnosis, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP

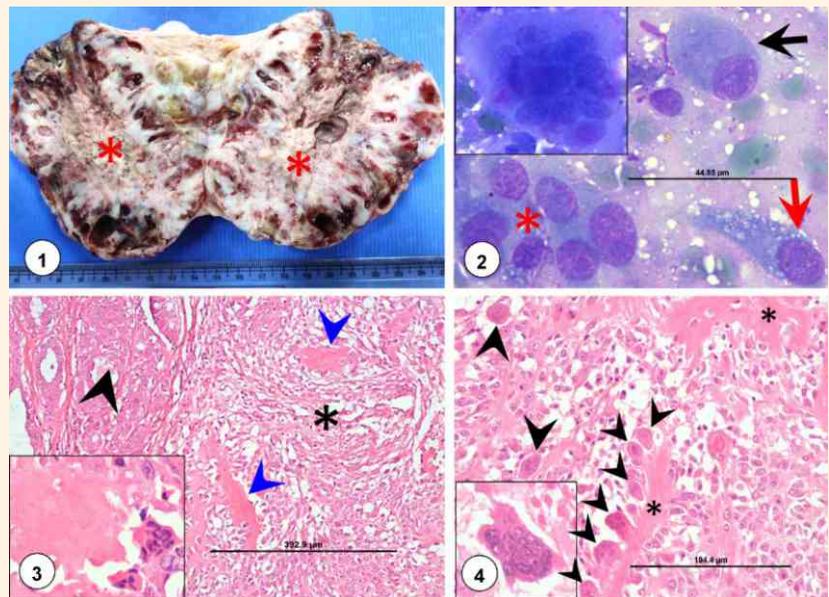


Fig. Osteoclastic sarcoma of canine mammary tumour. **1.** Large oval mass with irregular borders, small cystic cavities in center and very firm consistency (red asterisk). **2.** Fine-needle aspiration cytology (FNAC) showed osteoclast-like multinucleated giant cells (inset) along with malignant epithelial cell clusters (red asterisk), osteoblast (black arrow) and fibroblasts (red arrow). L-G cocktail, x1000. **3.** Tubulopapillary carcinoma (black arrowhead) along with osseous metaplasia, OMGCs (inset and blue arrowhead), and mesenchymal cells (black asterisk). H&E, x100. **4.** Numerous OMGCs (black arrowhead) situated close to the osteoid matrix (black asterisk) with resorption. H&E x200.

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Pathological and immunological characterization of bluetongue virus serotype 1 infection in type I interferons blocked immunocompetent adult mice

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A B S T R A C T

Introduction: Wild-type adult mice with intact interferon (IFN) system were neither susceptible to bluetongue virus (BTV) infection nor showed signs of morbidity/mortality. Establishment of immunologically competent wild-type adult mouse model with type I IFNs blockade is necessary to assess the pathogenesis, immune responses and testing of BTV vaccines.

Objectives: Present study aimed to establish and characterize BTV serotype 1 infection in immunocompetent adult mice with type I IFNs blockade at the time of infection by studying immune responses and sequential pathology.

Methods: Adult mice were administered with anti-mouse IFN- α/β receptor subunit-1 (IFNAR1) blocking antibody (Clone: MAR1-5A3) 24 h before and after BTV serotype 1 infection, and sacrificed at various time points. Sequential pathology, BTV localization by immunohistochemistry and quantification by qRT-PCR, immune cell kinetics and apoptosis by flow cytometry, and cytokines estimation by c-ELISA and qRT-PCR were studied.

Results: IFNAR blocked-infected mice developed clinical signs and typical lesions of BT; whereas, isotype-infected control mice did not develop any disease. The IFNAR blocked-infected mice showed enlarged, edematous, and congested lymph nodes (LNs) and spleen, and vascular (congestion and hemorrhage) and pneumonic lesions in lungs. Histopathologically, marked lymphoid depletion with "starry-sky pattern" due to lymphocytes apoptosis was noticed in the LNs and spleen. BTV antigen was detected and quantified in lymphoid organs, lungs, and other organs at various time points. Initial leukopenia (increased CD4⁺/CD8⁺ T cells ratio) followed by leukocytosis (decreased CD4⁺/CD8⁺ T cells ratio) and significantly increased biochemical values were noticed in IFNAR blocked-infected mice. Increased apoptotic cells in PBMCs and tissues coincided with viral load and levels of different cytokines in blood, spleen and draining LNs and notably varied between time points in IFNAR blocked-infected mice.

Conclusion: Present study is first to characterize BTV serotype 1 infection in immunocompetent adult mouse with type I IFNs blockade. The findings will be useful for studying pathogenesis and testing the efficacy of BTV vaccines.

Pictorial Glimpses of Online International Veterinary Pathology Congress, 26th-29th, December, 2020, Nagpur Veterinary College, MAFSU, Nagpur, MS



Inaugural Ceremony of Online International Veterinary Pathology Congress, 2020



Lighting of lamp by Chief Guest Shri Sunilji Kedar, Minister of Animal Husbandry, Dairy Development, Sports and Youth Welfare, MS and Pro-Chancellor, MAFSU, Nagpur during Inaugural Function



Shri Sunilji Kedar, Minister of Animal Husbandry, Dairy Development, Sports and Youth Welfare, MS & Pro-Chancellor, MAFSU, Nagpur and Chief Guest and Dr A.M. Paturkar, Vice Chancellor, MAFSU, Nagpur presiding over Inaugural Function



Release of compendium during online International Veterinary Pathology Congress, 2020



Dr B.N. Tripathi, DDG (AS), ICAR and President, IAPV addressing delegates during Inaugural Function



The Inaugural Function of Online International Veterinary Pathology Congress, 2020 attended by delegates and University officers

Lt. Gen. P.R. Venkatesh, Director General, Remount Veterinary Services & Colonel Commandant RVC (retired) was awarded Param Vishisht Seva Medal (PSVM) by President of India, Shri Ram Nath Kovind Ji. He is son of late eminent Professor P.K.R. Iyer of IVRI, Izatnagar. IAPV congratulates Gen. Venkatesh for this coveted gallantry award.



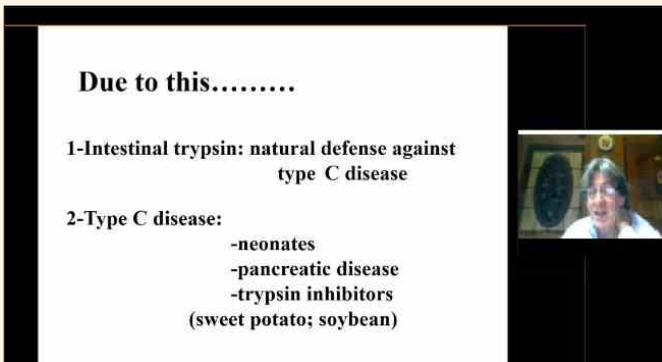
Annual IAVP/ICVP Conference



Dr N.V. Kurkure, Organizing Secretary offering Vote of Thanks during Inaugural Function



Dr A.K. Srivastava, Member (Animal Science), ASRB, New Delhi delivering IAVP-Thematic Lecture, 2020



Prof. Fransisco A. Uzal, School of Veterinary Medicine, University of California, Davis, US delivering IAVP-CEVP Lecture 2020



Dr K.P. Singh, Secretary General, IAVP addressing in Valedictory Function



Dr V.K. Gupta, President, ICVP addressing delegates during Valedictory Function



Dr C. Balachandran, Vice Chancellor, TANUVAS, Chennai and Chief Guest addressing delegates during Valedictory Function

Images Source- Dr N.V. Kurkure, Organizing Secretary
 Images Compiled By: Dr R. Somvanshi, Chief Editor, The Lesion

Two Pathology Students Winner of Prizes in All India Essay Competition

On occasion of Birth Centenary Year of Dr C.M. Singh; Dr C.M. Singh Endowment Trust, Bareilly, UP organized an All-India essay writing competition for Veterinary Science Students on topic 'Dr C.M. Singh: Life and Scientific Contributions in Advancement Veterinary and Animal Sciences in India' in Hindi and English languages. Dr Kuldeep Dhama, Principal Scientist, Division of Pathology, ICAR-IVRI, Izatnagar, UP financially sponsored this competition. Two students of Veterinary Pathology discipline were winners of First and Second Prize in Hindi version of competition.

Dr Kavisha Gangwar, MVSc Scholar, Department of Pathology, COVAS, DUVASU, Mathura, UP winner's of First Prize of Rs 2000/ cash, certificate etc.

Dr Megha Sharma, PhD Scholar, Division of Pathology, ICAR, IVRI, Izatnagar, Bareilly, UP winner's of Second Prize of Rs 1500/ cash, certificate etc.

Technical Report of Veterinary Pathology Congress, 2020, NVC, Nagpur

Department of Veterinary Pathology, Nagpur Veterinary College, Nagpur constituent College of Maharashtra Animal and Fishery Sciences University, Nagpur, Maharashtra, India successfully organized XXXVII Annual Conference of Indian Association of Veterinary Pathologists and XI Annual Meeting of Indian College of Veterinary Pathologists and International Symposium on “Role of Veterinary Pathology in Controlling Emerging and Re-Emerging Diseases of Livestock and Poultry: An One Health Approach” by virtual mode during 26th -29th December, 2020. The International Conference was organized in association with the Indian Association of Veterinary Pathologists and the Indian College of Veterinary Pathologists. Due to the Nationwide COVID-19 pandemic outbreak, the conference was organized by virtual mode using the CISCO Webex Platform and it was an excellent experience for the organizers and all participants. Dr N.V. Kurkure, Director of Research, Maharashtra Animal and Fishery Sciences University, Nagpur and Professor and Head, Department of Veterinary Pathology, Nagpur Veterinary College, Nagpur, was the Organizing Secretary of the said Conference. The Conference aimed to bring Veterinary Pathologists, disease diagnosticians, scholars and scientists from other allied sciences under one umbrella and share research findings and ideas. Intellectuals explored the scope of Veterinary Pathology in one health, food security and environmental protection. About 329 delegates (including 10+ international), including academicians, researchers, students, field veterinarians etc. virtually participated in this scientific gathering from different parts of the country and abroad.

The International Conference's inaugural function was held at Conference Hall, MAFSU, Nagpur on 26th December 2020 at 10.00 AM. The Chief Guest of function Shri Sunilji Kedar, Minister for Animal Husbandry, Dairy Development, Sports and Youth Welfare, Maharashtra State, Mumbai, inaugurated the conference, Col. (Prof.) Dr A.M. Paturkar, Vice-Chancellor of MAFSU, Nagpur presided over the function. Dr B.N. Tripathi, Deputy Director General (Animal Sciences), Indian Council of Agricultural Research, New Delhi, graced the function as Guest of Honor in the inaugural program. Dr A.P. Somkuwar, Director of Instruction and Dean, Faculty of Veterinary Sciences, Dr V.D. Aher, Director of Extension & Training, Dr P.T. Jadhao, Dean, Lower Education, Mr D.B. Raut, Registrar, Dr S.B. Kawitkar, Associate Dean, NVC, MAFSU, Nagpur and other senior officers/ dignitaries from the MAFSU, Nagpur were present physically in the inaugural function. Dr B.N. Tripathi, President IAVP, Dr R. Somvanshi, Ex. President, IAVP, Dr V.K. Gupta, President, ICVP, Dr K.P. Singh, Secretary General, IAVP, Dr K.S. Prasanna, Vice President, ICVP, Dr Palanivelu M. Treasurer and Secretary, ICVP and other IAVP and ICVP office bearers and executive members graced the occasion virtually. Organizing Committee Chairman Dr A.P. Somkuwar, Director of Instruction and Dean, Faculty of Veterinary Sciences, MAFSU, Nagpur, welcomed all the dignitaries and delegates and briefed them about the theme of the conference and activities carried out at the Department of Veterinary Pathology, NVC, Nagpur. Dr B.N. Tripathi the President, elaborated the role of Veterinary Pathologist's in disease diagnosis and need-based laboratories for disease diagnosis at the field level. Dr V.K. Gupta, President, ICVP, briefed the gathering about the importance and future prospective of ICVP and ICVP Board Examination. Secretary General of IAVP, Dr K.P. Singh presented annual report of IAVP and apprised positive growth of IAVP. He announced FIAVP awards for the year 2019 to Dr S.K. Mukhopadhyay, Dr Anand Kumar and Dr N.V. Kurkure. He also announced different IAVP-IJVP Awards for 2019. Shri Sunilji Kedar, Minister for Animal Husbandry, Dairy Development, Sports and Youth Welfare Maharashtra State, during his inaugural speech, explained significance of the role of Veterinary Pathologists and diagnostic laboratories in advance disease diagnosis in veterinary sciences and appreciated the current theme chosen for the conference. Col. (Prof.) Dr A.M. Paturkar addressed a need for one health approach for disease diagnosis and controlling emerging and re-emerging diseases in livestock and poultry. Dr N.V. Kurkure, Organizing Secretary, proposed a vote of thanks to all the dignitaries and one and all.

The four-day conference was scheduled in 8 Technical Sessions for lead presentations, one Technical Session for ICVP and one Technical Session for poster presentations. The three membered panels comprising of Chairman, Co-chairman, and Rapporteur conducted the proceedings of session. The Judges' panel evaluated the posters and awards by virtual mode. The inaugural program was followed by Session I on IAVP-Dr P.P. Gupta Oration Lecture, in which Dr Ram Kumar, Retd. Principal Scientist, ICAR-IVRI, Izatnagar delivered a lecture on “Retroviral infectious in small ruminants.” Session II was followed on IAVP Thematic Lecture on “One Health Approach” by Dr A.K. Shrivastava, Member, Agricultural Scientist Recruitment Board, ICAR, New Delhi. Session III was dedicated to the IAVP-Young Scientist Award Presentation. A total of 20 young pathologists from different parts of the country presented their research work on various topics and was evaluated by virtual mode by the expert pathologists of IAVP. Session IV was an Online Poster Presentation Session in which 67 participants participated in the competition.

E-posters were uploaded on Nagpur Veterinary College, Nagpur website and were evaluated virtually by the eminent pathologist of IAVP. The second day of the conference started with Session V, which comprised a Laboratory Animal and Toxicopathology Session in which a total of three lead papers were presented. Dr Alok Sharma, Director, Global Anatomic Pathology, Covance Laboratories Inc. Madison, WI, USA, presented a lead paper on "Basics of preclinical toxicity testing and role of the toxicologic pathologist." Dr Rudara Channappanavar, Assistant Professor, The University of Tennessee Health Science Centre, USA, delivered a lecture on "Respiratory pathology with reference to Covid-19". Dr Gaurav Tyagi, Senior Principal Scientist, Roche Innovation Center, New York, USA, delivered a lecture on "Hypersensitivity reactions to a monoclonal antibody in cynomolgus monkeys." Session VI was on IAVP-Continuing Veterinary Pathology Education lecture. Prof. Francisco A. Uzal, Professor of Veterinary Diagnostic Pathology, California Animal Health and Food Safety Laboratory, School of Veterinary Medicine University of California, Davis, delivered a very informative and educational presentation on "Current advances in pathology of sheep diseases with special reference to Clostridial and other enteric diseases." Session VII was of the IAVP-Prof. S. Ramachandran Molecular Oncology Award Session. A total of four participants from different parts of the country presented their noteworthy contributions to the concerned field. The competition for the young scientist award, molecular oncology award and the e-poster award was provided by giving each participant specific codes to maintain confidentiality. Session VIII was on Clinical and Diagnostic Pathology. Dr America E. Mederos, from Programa Nacional Carne Y Lana INIA Tacuarembó, Uruguay presented a lead paper on "Drug resistance of gastrointestinal nematodes in ruminants and sustainable control measures with reference to the use of secondary plant compounds." Dr N.K. Sood, GADVASU, Ludhiana elaborated in detail on "Morphogenesis of toxic neutrophils and their prognosis relevance in veterinary diagnosis." All participants enjoyed the new scientific information presented by them.

Day 3 was allotted for the ICVP Session, which comprised- Report on activities of ICVP and an outline of ICVP by Dr N. Pazhanivel, Secretary ICVP, followed by the importance of ICVP and its future strategies by Dr V.K. Gupta, President, ICVP. Dr S.H. Rawal, Dr Kuldeep Gupta and Dr Debiprasanna Das presented model case presentation papers on descriptive histopathology, cytopathology in diagnosing commonly occurring neoplasia and Theileriosis in a bovine calf, respectively. It was followed by virtual EC/General Body meetings of IAVP and ICVP. In the special evening mega session, Dr Francisco A. Uzal, Professor of Veterinary Diagnostic Pathology, California Animal Health and Food Safety Laboratory, School of the Veterinary Medicine University of California, Davis, USA, delivered a very informative and interactive deliberation on "How to make a gross morphologic diagnosis as a pathologist". Day-4 started with Farm Animal and Avian Pathology Sessions in which three International Speakers, namely Dr Kevill Keel from University of California Davis, School of Veterinary Medicine, University of California, Davis, USA, delivered the lead paper on "A Survey of Infectious Diseases of Cervids", Dr Asli Mete, School of Veterinary Medicine, California Animal Health and Food Safety Laboratory System, University of California, Davis, USA, delivered the lead paper on "Avian Viral Diseases in Poultry and other Species" and Dr Shaan Kumar, Assistant Professor, College of Veterinary Medicine, Iowa State University, USA, explained feline pathology in detail under the title, "Let the cat out of the bag". All these presentations were very interesting and informative. Dr John Sundberg from Jackson Laboratory, Bar Harbor, ME, USA, virtually presented a lecture on "The laboratory mouse papillomavirus: a model for understanding the pathogenesis and prevention of skin cancer". The participants enjoyed the advanced informative talk.

The Valedictory Function was presided over by Dr A.P. Somkuwar, Director of Instruction and Dean, Faculty of Veterinary Sciences, MAFSU, Nagpur. Dr S.B. Kawitkar, Associate Dean, NVC, Nagpur and Dr N.V. Kurkure, Director of Research, MAFSU, Nagpur and Organizing Secretary were also present. While Dr B.N. Tripathi, President, IAVP, Dr D.V. Joshi and Dr Amarjit Singh, Vice Presidents, IAVP, Dr V.K. Gupta, President, ICVP, Dr K.P. Singh, Secretary General, IAVP and Dr R. Somvanshi, Ex. President, IAVP, Dr Palanivelu M., Treasurer and Secretary ICVP and several delegates attended the valedictory function virtually. Dr C. Balachandran, Vice Chancellor, TANUVAS, Chennai, was the Chief Guest for the Valedictory Function. Dr K.P. Singh, Secretary General of IAVP, announced results of IAVP Awards including IAVP-Fellowships, IAVP-Best MVSc/PhD Thesis Awards, IAVP Young Scientist Awards for Best Oral Presentation, IAVP-Prof. S. Ramachandran Memorial Best Molecular Oncologist Presentation Award, IAVP-Best Poster Presentation Awards, IAVP-Achievement Awards in Specialty Subjects etc. These award Certificate were presented through online mode to winners. Dr N. Pazhanivel, Secretary ICVP, announced the results of ICVP Awards to participants. Dr B.N. Tripathi, President, congratulated the Organizing Secretary and his team for this systematic and best organized virtual International IAVP Congress. Secretary General of IAVP presented IAVP-Organizing Secretary Appreciation Certificate to Dr N.V. Kurkure and Team Members to organize this International Congress in

a well-fitted manner. In the concluding remark, the President, Organizing Committee Chairman and Organizing Secretary thanked the delegates, students and officials for extending their cooperation in successful conduct of the conference. The four days' successful scientifically event ended with the National anthem and with a pledge to meet for next IAVP Congress, 2021 at RAJUVAS, Bikaner, Rajasthan.

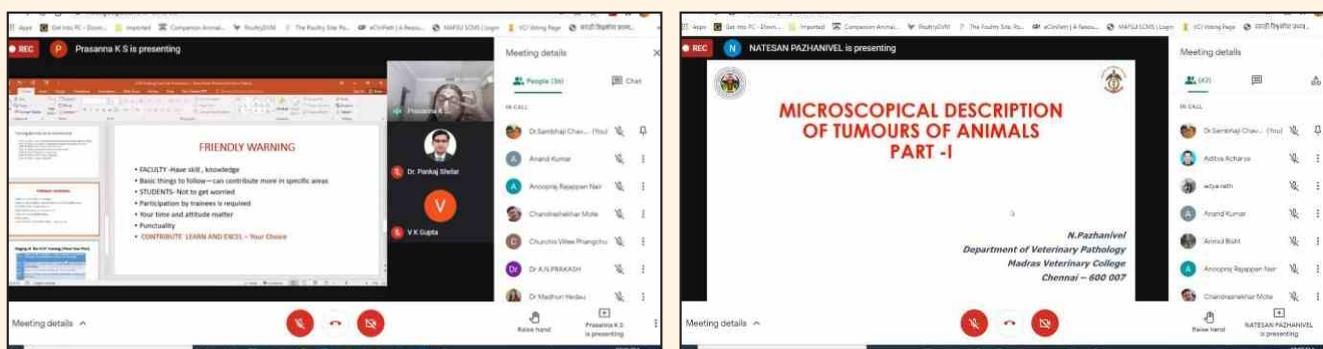
-Dr N.V. Kurkure, Organizing Secretary & Director of Research, Maharashtra Animal and Fishery Sciences University, Nagpur and Professor & Head, Department of Veterinary Pathology, Nagpur Veterinary College, Nagpur, MS

Trainings

Virtual Flagship ICVP Training Programme

Indian College of Veterinary Pathologists (ICVP) was established in 2008 as an independent certification organization for personal accreditation in India. The examination system of the ICVP is analogous to the examination pattern of other global Veterinary Pathology certification systems. For any such foundations to be fully purposeful, a well-established training programme is essential side by side. Considering the wide disparity in the availability of training resources between various training institutions inside the country, ICVP started a unique training system for progressing the knowledge and skill of pathologists who wish to be a part of this certification body. The foundation stone for this missionary approach was laid down during the first wave of covid pandemic in May, 2020 with the creation of a committee of Diplomates for developing a "Model Training Document". This document highlighted the syllabus, the plan and methods, different stages, and administration pattern of the training process. The Diplomates whole heartedly accepted the model training document and suggested appropriate modifications to make it a Magna Carta of ICVP Training. There after a new training committee was framed, chat groups were created and the executive committee of the ICVP provided necessary instructions to the trainees on the ensuing training programme. Due to Covid pandemic, it was difficult to think of a centralized training programme as initially envisaged and hence it was decided to go online using a suitable virtual training platform. Thus, the first session of the training got the kick start on 16th April, 2020 via Google Meet. Though the interactions with the trainees was not optimal, twenty-five weeklies on line sessions of the ICVP Training took place regularly on almost all Saturdays, with excellent scholarly presentation of different topics by the Diplomates. The senior diplomates were kind enough to deliver specific and general topics nurtured by their valuable experience and wisdom. The youngsters were also enthusiastic to share their skill and knowledge in areas of their interest. Nevertheless, the case presentations from the trainees could not be accomplished as scheduled, there were a few good presentations on interesting cases from the trainees as well. Now, this flagship programme of ICVP Training has to be taken forward with better participation from the trainees with an established credit system for both trainees and trainers. The persistent support from the training, administration and executive committees along with ceaseless encouragement from all the Diplomates became the driving force to develop and conduct this unmatched training, as a continuing education programme in the field of Veterinary Pathology. With this the ICVP will remain a model to all other professional bodies in the country to launch such a certification and training system to make its members honed with cutting edge expertise to cater the needs of modern veterinary practices in the country.

-Dr K.S. Prasanna, Vice President & Training Coordinator, ICVP, KVASU, Mannuthy, Thrissur, Kerala



Screen Shots of Training Lectures

Advance National Training Course for 21 Days on “Advances in Veterinary Pathology for Intensive Livestock Development” held at West Bengal University of Animal and Fishery Sciences, Kolkata from 10-30 November, 2021 in virtual mode

A 21 days training on “Advances in Veterinary Pathology for Intensive Livestock Development, ANTC-2021” held in West Bengal University of Animal and Fishery Sciences, Kolkata from 10-30 November, 2021. The training was started with the registration of 72 participants among which 60 participants were Assistant Professor from various Veterinary University and Colleges from all states of India. Few PG, PhD students, KVK personnel, Scientists etc. also enrolled in this training. On 10th November, 2021 the inaugural session was held with the gracious presence of Prof. N. Ghosh, Dean, Faculty of Veterinary and Animal Sciences, Prof. S. Guha, Vice-Chancellor, Prof. S. Batabyal, Director of Research, Extension and Farms, WBUAFS along with other dignitaries. A number of eminent speakers from CCMB, Hyderabad, NCCS, Pune, CIPLA, India, SFSL, Kolkata, CMVL, Meerut, ICAR-NIVEDI, Bengaluru, NIT, Nagaland, NCCM, Kolkata, ICAR-IVRI, Izatnagar etc. delivered lectures on various emerging topics like history of veterinary pathology, finger printing, ICT, conservation of endangered species, fish pathology, histochemistry, meta-analysis, immunopathology, cell cyclins and laboratory accreditation in particular. On the concluding day, i.e., on 30.11.2021, the Valedictory Session was addressed by Dean, VC, DREF of WBUAFS along with kind presence of Prof. H.D. Naryanaswamy, Vice Chancellor, KVAFSU, Bidar and Dr Praveen Malik, Animal Husbandry Commissioner, Govt. of India. The training programme was conducted jointly with National Agriculture Development Cooperative Ltd. (NADCL) Baramulla, Union Territory of J & K.



-Dr Nimai C. Patra, Associate Professor, Department of Veterinary Pathology, Faculty of Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences, Belgachia, Kolkata, West Bengal

Promotion News

Dr K.P. Singh joined as Acting Joint Director, CADRAD, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP. Earlier he was looking after charge of Head, Division of Pathology, IVRI too. He is serving IAVP as Secretary General and also taking care of publication IJVP since many years. Dr Singh is known for animal disease diagnosis and researches on blue tongue.



Dr G. Saikumar joined as Acting Joint Director (Research), ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP. Earlier he was in charge of PME Cell. He is also looking after work of Head, Division of Pathology, IVRI, Izatnagar, UP. Dr Saikumar is well known for his research on classical swine fever, PCV, Japanese Encephalitis etc. He is very good teacher and orator.



Dr P. Krishnamoorthy, Senior Scientist, Pathoepidemiology Laboratory, ICAR National Institute of Veterinary Epidemiology and Disease Informatics, Bengaluru received recognition as one of the eight De Facto Members appointed by the Founding Diplomates on the credentials for fulfilling the criteria of the speciality program of the Indian College of Laboratory Animal Medicine (ICLAM). He is also awarded with De Facto Diplomate by Indian College of Laboratory Animal Medicine on 17th July 2021 for his contribution to Laboratory Animal Science. He has successfully completed the Indira Gandhi National Open University (IGNOU), New Delhi conducted Distance Learning Programme on Post Graduate Diploma in Animal Welfare (PGDAW) for the academic year 2020-21.



Obituaries

Dr M. Palanivelu

(1983-2021)

Dr Munuswamy Palanivelu (38) was born on 19th September, 1983 at Vizhidiyur village, Karaikal District, Puducherry. He was awarded BVSc & AH degree (2007) and MVSc (2011) degree in Veterinary Pathology from Rajiv Gandhi College of Veterinary and Animal Sciences, Puducherry. During his MVSc, he worked on “Gross, cytological, histopathological and histochemical studies on cutaneous tumours of dogs” under the guidance of Dr A.W. Lakkawar, Professor, Department of Veterinary Pathology. He was pursuing PhD degree from 2016 on topic entitles “Pathology, molecular epidemiology and immune responses in Infectious Laryngotracheitis Virus (ILTV) infection in chicken” under the able guidance of Dr K.P. Singh, Acting Joint Director, CADRAD, ICAR-Indian Veterinary Research Institute, Izatnagar, UP. He started his career as Teaching Associate (2011-12) at Department of Veterinary Pathology, College of Veterinary Sciences, Proddatur, Andhra Pradesh. Then, he worked in Indian Immunologicals Ltd. (2012-2013) at Andhra Pradesh. Afterwards, he joined Agricultural Research Services and served as Scientist (1st January 2013 till 09th June 2021) at Avian Diseases Section, Division of Pathology, ICAR-IVRI, Izatnagar, Bareilly, UP. During his services in ICAR-IVRI, he completed Institute research project entitled “Pathomorphological and molecular diagnosis of important viral respiratory diseases of poultry” as Principal Investigator. He was PI of DST-SERB funded project entitled “Exploring the role of pyroptosis and elucidating the use of pyroptotic inhibitors to block proinflammatory cell death in chicken tracheal epithelial cells infected with infectious laryngotracheitis virus (February 2020-likely to be completed on February 2023). He also acted as Co-PI in several institute and externally funded projects of various Divisions at IVRI. During his career, he had published several research publications, 40 abstracts in symposia/ seminars, 3 popular articles, 3 book chapters to disseminate the scientific knowledge and technologies. Dr M. Palanivelu has been recipient of several national awards including IAVP-Prof. Dr S Ramachandran Memorial Award, 2013, IAVP-Dr C.M. Singh Memorial Award, 2017, IAVP-Best Oral Presentation Award etc. His areas of research interest were on canine cutaneous neoplasms, avian pathology especially on avian viral respiratory diseases and providing solutions to problems of poultry farmers. Dr M. Palanivelu has been tirelessly contributing to science through his hard work and meticulous research. He was also actively engaged in UG and PG teaching at Deemed University, IVRI. He made significant contributions in the control and prevention of a number of poultry diseases by attending various disease outbreak investigations in different parts of the country. He was actively involved in wildlife disease investigations particularly conducting postmortem of wild birds and screening of samples for various avian diseases. Dr Palanivelu was Life Member and Treasurer of IAVP. He was one of the COVID warrior at IVRI and assisted in testing samples of humans, until he fell for it himself. Dr M. Palanivelu was an excellent badminton and cricket player. Dr M. Palanivelu suddenly passed away at Yashoda Super Specialty Hospital, Kaushambi, Ghaziabad on dated 09.06.2021, after a long and hard fought with COVID-19 induced severe respiratory complications. He is survived with his wife Dr (Mrs) P. Bhavani Puvvala, MVSc (Veterinary Microbiology) and daughter Rishita (3 years). Sudden demise of Dr M. Palanivelu is shocking and a great loss to family, relatives, friends, Veterinary fraternity, IAVP, Veterinary Pathology faculty and poultry farmers. His near and dears paid rich tributes to him on various social media. May God give peace to departed soul and strength to his grieved family members to bear this great loss. **IAVP conveys deep condolences to bereaved family to bear this irreparable untimely loss and prays almighty God for eternal peace to departed soul.**

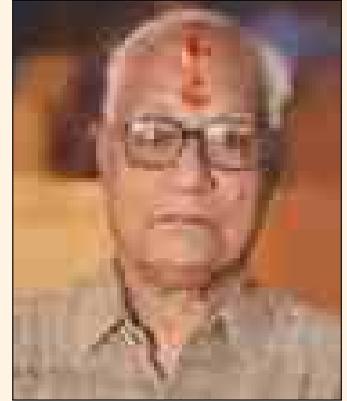


Obituaries

Dr J.N. Dwivedi

(1937-2021)

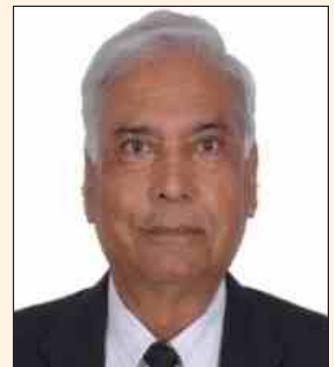
Professor J.N. Dwivedi (84), BVSc&AH, MVSc, PhD and FRVCS (Sweden), Fellow NAVS, veteran Veterinary Pathologist, former Dean, Professor and Head of Department of Pathology, College of Veterinary Science and Animal Husbandry, Mathura, CSAUA&T, Kanpur (now DUVASU, Mathura) was born on 10th July, 1937 in village Banjari, Birsinghpur, Ghatampur, Kanpur Nagar, UP. After obtaining BVSc&AH degree in year 1959; he started his carrier as Veterinary Assistant Surgeon and then he joined as Demonstrator at Veterinary College, Mathura, UP in 1960. He served as Professor & Head, Department of Pathology from 1969-1981. Professor Dwivedi joined as Dean, College of Veterinary Science and Animal Husbandry, Mathura, UP in 1987 and served for a period of 10 years. He completed his MVSc (1961) and PhD (1968) degrees in Veterinary Pathology as in-service candidate from Agra University, Agra, UP under able guidance of renowned personality Dr C.M. Singh. His thesis title for MVSc was "Studies on the pathology of pneumonia and associated pulmonary diseases in cattle and buffaloes" while PhD thesis topic was on "Studies on the pathology of female reproductive organs in buffaloes". For more than three decades he was associated with undergraduate and post graduate teaching and research. He guided a number of MVSc and PhD students in discipline of Veterinary Pathology. Dr Dwivedi published more than 70 research papers in reputed journals and delivered several radio talks for benefits of farmers. He was recipient of gold medal and Vice-Chancellor medal during graduation in 1959. He was awarded prestigious FAO/SIDA International Fellowship in 1970 and NAVS Fellowship in 1996. He was Principal Investigator of PL-480 Project, Pneumonia in sheep and goats, Marek's disease in poultry Project etc. He also received appreciation certificate from USAID. He did postdoctoral fellowship (FRVCS) at Royal Veterinary College, Stockholm, Sweden. During his professional carrier he visited many countries like-Sweden, Finland, Norway, Denmark, Germany, Holland, England and Iraq. He was Life Member of a number professional societies such as IAVP, IAVMI, IPSA and Dr C.M. Singh Endowment Trust, Bareilly. He retired from the post of Dean on dated 9th July, 1997. After superannuation he passed away heavenly abode on 10th May, 2021 at Dabauli, Kanpur Nagar, UP. He is survived by his wife, son and two daughters. **IAVP conveys deep condolences to bereaved family to bear this irreparable loss and prays almighty God for eternal peace to departed soul.**



Dr R.N. Sharma

(1940-2021)

Dr Ravindra Nath Sharma (81) was born on 1st January, 1940 at Allahabad, UP. He is an eminent Veterinary Pathologist and currently serving as Professor of Pathology and Avian Diseases, Associate Dean, School of Graduate Studies and Associate Director Research at the School of Veterinary Medicine, St. George's University, Grenada. Dr Sharma a graduate of 1961 from the UP College of Veterinary Sciences and Animal Husbandry, Mathura, obtained MVSc and PhD degree in Veterinary Pathology from, IVRI, Izatnagar, UP in 1965 and 1974, respectively. He joined as Research Assistant at IVRI in 1965 and within a short period of 11 years rose to the rank of Professor. Dr Sharma has served in five international universities, two each in Asia (India and Iran) and Africa (Zambia and Libya) and currently working with one in Central America (West Indies). In Iran, Libya, Zambia and Grenada (West Indies) he served as Head, Department of Pathology. In India, he worked on Marek's disease in chickens and developed suitable diagnostic reagents for its diagnosis. In Zambia, isolation and implementation of control measures for several zoonotic serotypes of Salmonella spp. from poultry. During 4-year mission of CFTC in Zambia, he played a significant role in making Zambia free of certain poultry diseases. In Iran, Dr Sharma unveiled many diseases in livestock, not reported earlier. Identification of Linguatula serrata (zoonotic) in lung of goats is worth to mention. In Grenada, his research is mostly concentrated on zoonotic diseases with special reference to campylobacteriosis, salmonellosis, toxoplasmosis and Leptospirosis. Major contribution of Dr Sharma to veterinary profession was establishment of Veterinary



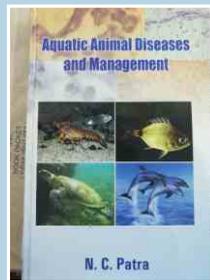
Schools in the Republic of Zambia and in Grenada. In Grenada, he initiated “an outreach program” for the benefit of Grenadian community since last 12 years.

Dr Sharma has mentored more than 2 dozen students for their PhD and MSc degrees in Veterinary Pathology. He has written a book, 3 monographs and published 175 research papers. He has made more than 20 presentations at international scientific meetings. He was an active member of the committee for the establishment of the IAVP and publication of Indian Journal of Veterinary Pathology in 1972 and 1974, respectively. He contributed is formation of IVRI Alumni Association in 1968. He served as Secretary of the association till he left India in 1976 for CFTC assignment. Dr Sharma is recipient of the “ICAR Jawahar Lal Nehru Award” of the year 1975 for his outstanding contribution in the field of Veterinary Pathology. In 2008 he was awarded Pfizer Research Excellence Award for his research contributions. In 1976, selection of Dr Sharma as consultant to the Commonwealth Fund for Technical Cooperation (CFTC) was his great achievement. He was superannuated from university services a couple of years ago and passed away heavenly abode at Grenada, West Indies in last week on November, 2021. **IAVP conveys deep condolences to bereaved family to bear this irreparable loss and prays almighty God for eternal peace to departed soul.**

New Book

Aquatic Animal Diseases and Management- By N.C. Patra, West Bengal University of Animal and Fishery Sciences, Kolkata

A book entitled “Aquatic Animal Diseases and Management” by Dr N.C. Patra, Associate Prof., Department of Veterinary Pathology, Faculty of Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata has been published by Narendra Publishing House, Delhi with ISBN No. 978-93-82471-95-0 with the website www.nphindia.com. The book covers general information, different body systems of fish, management of fishery, fish processing technology, ornamental fishery, feeding in fishery, diseases of fish, crustacean diseases, large and small aquatic animal diseases, toxicopathology of aquatic animals, neoplasia, OIE and health care management. Book had hard cover binding of 160 pages and discounted price is Rs1611/-. It may serve the basic requirement in emerging area of fish pathology.



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