Proceedings

17th Indian Veterinary Congress, XXIV Annual Conference of IAAVR and National Symposium on "New Generation Vaccines, Diagnostics for Improvement of Animal Health & Productivity *vis-a-vis* Genomic Interventions for the Societal Benefit"

&

Supplementary Abstracts

17th INDIAN VETERINARY CONGRESS

IAAVRCONG-2017 (8-9 April, 2017)

ICAR-INDIAN VETERINARY RESEARCH INSTITUTE

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Indian Association for the Advancement of Veterinary Research

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Protecting Livestock – Improving Human Lives

INAUGURAL FUNCTION

8th APRIL 2017

Venue: Auditorium, ICAR-IVRI, Izatnagar

09.30 A.M.	Assembly of Delegates
10.00 A.M.	Arrival of Guests on the Dias
10.05 A.M	Inaugural function begins
10.06 A.M.	Lighting of Lamp
10.12 A.M.	Sarswati Vandana
10.20 A.M.	ICAR & IVRI SONG
10.25 A.M	Welcome Address: Dr B.P. Mishra, Co-Chairman
10.25 A.M.	Presentation of flowers to Dias
10.28 A.M.	Address by Dr S.N. Singh - President, IAAVR
10.35 A.M.	Address by Dr Rishendra Verma- Secretary
10.45 A.M.	Release of Publications
11.00 A.M.	Address by Dr Manmohan Singh Spl. Chief Secy Govt. Andhra Pradesh , Guest of Honour
11.10 A.M.	Award Ceremony
11.30 Noon	Address by Dr R.K. Singh, Director, ICAR-IVRI
11.30 A.M.	Launch of IAAVR New website
11.35 A.M.	Address by Dr Trilochan Mohapatra Secretary DARE &DG, ICAR, Chief Guest
12.00 Noon	Presentation of Mementos to VIPs
12.05 P.M.	Vote of Thanks- Dr R.K. Bagherwal Vice President, IAAVR
12.10 P.M.	NATIONAL ANTHEM
12.12 P.M.	High TEA
12.30 P.M.	PLENARY SESSION
01.45 P.M.	LUNCH
02.30 P.M.	SESSIONS

VALEDICTORY FUNCTION

9th APRIL 2017

Venue: Auditorium, ICAR-IVRI, Izatnagar

02.30 P.M.	Assembly of Delegates
02.45 P.M.	Arrival of Guests on the Dias
02.50 P.M.	Valedictory function begins
02.55 P.M.	ICAR & IVRI SONG
03.00 P.M.	Welcome Address Dr B.P. Mishra, Co-Chairman
0 3.05 P.M .	Presentation of flowers to Dias
03.10 P.M.	Presentation of Report by Dr Rishendra Verma
03.20 A.M.	Remarks by Dr S.N. Singh- President, IAAVR
03.30 P.M.	Award Ceremony
03.40 P.M.	Address by Dr D.T. Mourya, Guest of Honour
03.50 P.M.	Address by Dr R.K. Singh, Director, IVRI
03.52 P.M.	Address by Dr Manmohan Singh, Special Chief Secretary Govt. of Andhra Pradesh
04.10P.M.	Presentation of Mementos to VIPs
04.15 P.M.	Vote of Thanks- Dr Rishendra Verma, Organizing Secretary
04.15 P.M.	NATIONAL ANTHEM
04.20 P.M.	TEA

Compiled by:
Prof. (Dr.) Rishendra Verma
Founder Secretary, IAAVR

Year: 2017

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REPORT

SEVENTEENTH INDIAN VETERINARY CONGRESS

XXIV Annual Conference of Indian Association for Advancement of Veterinary Research (IAAVR)

National Symposium

"NEW GENERATION VACCINES, DIAGNOSTICS FOR IMPROVEMENT OF ANIMAL HEALTH & PROD UCTIVITY *VIS-À-VIS* GENOMIC INTERVENTIONS FOR THE SOCIETAL BENEFIT"

(08-04-2017 to 09-04-2017)

at

ICAR-INDIAN VETERINARY RESEARCH INSTITUTE

Izatnagar-243 122 (UP), India

L-R: Dr B.P. Mishra, Dr R.K. Singh, Dr Trilochan Mohapatra, Dr Manmohan Singh, Dr S.N. Singh, Dr Rishendra Verma, Dr Sanjiv Gupta

The 17th Indian Veterinary Congress, XXIV Annual Conference of Indian Association for Advancement of Veterinary Research (IAAVR) and National Symposium on "**New Generation Vaccines, Diagnostics for Improvement of Animal Health & Productivity vis-a-vis Genomci Interventions for the Societal Benefit"** was organized by Indian Association for the Advancement of Veterinary Research (IAAVR) at ICAR-Indian Veterinary Research Institute, Izatnagar during 8th-9th April, 2017. Over 350 delegates from all over the country participated in the two-days Congress

Lightening of Lamp by Prof. (Dr.) Trilochan Mohapatra, Secretary DARE & DG, ICAR; Dr R.K. Singh, Director, ICAR-IVRI

The Congress was inaugurated on 08.4.2017 at the hands of Hon'ble **Dr Trilochan Mohapatra**, Secretary DARE and DG, ICAR, Dr Manmohan Singh, Hon'ble Special Chief Secretary, Govt. of Andhra Pradesh was the Guest of Honor. **Dr R.K. Singh**, Honb'le Director & Vice Chancellor, IVRI, Izatnagar presided over the function. **Dr B.P. Mishra**, Joint Director (Res), IVRI, Izatnagar and **Dr S.N. Singh**, President, **Dr Rishendra Verma**, Founder Secretary & Organizing Secretary were on the dais. Among the audience, **Dr D.T. Mourya**, Director, National Institute of Virology, Pune, **Dr M.P. Yadav,** Ex Director (IVRI & VC, SBPUAT, Meerut**, Dr P.K. Uppal,** Advsior to CM, Chandigarh, Punjab, **Dr Nagendra Sharma,** Ex-Director (IVRI & VC, SKUSAT, Jammu, **Dr Amresh Kumar**, Ex-Dean, COVSc, GPAUA&T, Pantnagar & DG, KCMT, Bareilly**, Dr V.K. Gupta,** JD(CADRAD), IVRI, **Dr A.K. Garg,** JD(EE), IVRI, **Dr Triveni Dutt,** JD (A), IVRI, **Dr Stefano Messori,** OIE, France, **Dr Ashok Kumar,** ADG (AH), ICAR, New Delhi**, Dr Vineet Bhasin,** Principal Scientist, ICAR, New Delhi**, Dr Arjava Sharma,** Director, ICAR-NBAGR, Karnal, **Dr Sunil Gupta,** Additional Director, NCDC, New Delhi**, Dr Abhjit Mitra,** Director, ICAR-NRC on Mithun, Nagaland**, Dr B.N. Tripathi,** Director, ICAR-NRC on Equines, Hisar**, Dr J.M. Kataria, Director,** ICAR-CARI, Izatnagar, **Dr Y.P. Dabas,** Director (Extension), GBPUA&T, Pantnagar, **Dr R.C. Patra,** Dean, College of Veterinary Science, Bhubaneswar, **Dr Ranum Dabas,** Scientist (IV), FSSAI, New Delhi, **Dr Jai Prakash,** Sr. PSO, IP Commission, Ghaziabad**, Dr D.V.R. Prakash Rao,** Chairman, Prakash Feed, Chennai, **Dr Neelam Taneja,** Prof. Deptt. of Microbiology, PGIMER, Chandigarh, **Dr Sarman Singh**, Prof., AIIMS, New Delhi, **Dr V. Khoma**, Deputy Director, Nagaland Hospital, Nagaland, **Dr Rahul Naranag**, Prof., Deptt Microbiology, MGIMS, Wardha, **Dr Pradeep Deshmukh**, Prof, Community Medicine, MGIMS, Wardha, **Dr Amit Kumar Singh,** Scientist C, ICMR HQ, New Delhi, **Dr Mamta Dhawan**, Regional Manager-South Asia, GALVmed, New Delhi, **Dr Rahul Srivastava**, GALVmed, New Delhi, **Dr S.K. Tewari,** DIG, SSB, New Delhi, **Dr Arun Atrey**, President, Global Animal Health Business & President, INFAH, **Mr. Vijay Teng**, Sr. Vice-President, Intas, **Dr Nitin Bhatia**, Chief Editor, POLIVET, **Dr D.K. Dey**, CEO, Globian BioTech, Hyderabad, **Dr Sanjay Gavkare**, VH Group, Pune, **Dr A.K. Bhattacharya**, Aruniko Health Care, Faridabad, **Mr. Puneet Chopra**, Panav Biotech, New Delhi, **Mr. Devendra Sharma**, Indian Herbs, Saharanpur, **Dr Santosh**, Alembic, Mumbasi, **Dr D.J. Kalita**, Sr. Manager, Zydus Animal Health, **Dr Mahesh Chandra**, Head, Division of Extension Education, IVRI, **Maj. Gen. M.L. Sharma** (Retd), CEO, The Brookes India, **Dr T.V.S. Rao**, Brilliant Bioharma, Hyderabad, and many others graced the event.

Dr Manmohan Singh, Chief Guest, Valedictory Function

Dr D.T. Mourya, Guest of Honour, Valedictory Function

Dr Rishendra Verma, Founder Secretary, IAAVR in his address enumerated milestones as follows:

Milestones

- IAAVR was registered on 8th January 1991
- IAAVR organized first meeting of its inauguration having Dr P.N, Bhat, Director, IVRI as its Chief Guest
- IAAVR released The Indian Journal of Veterinary Research through hands of Dr D.S. Balain, Director, IVRI
- IAAVR launched its website www.iaavr.org through hands of Dr Tej Pratap, Vice-Chancellor, CSK University of Agriculture & Technology, Palampur
- IAAVR first time released abstracts in CD form to Nagpur
- IAAVR became Associate Member of World Veterinary Association in 2004-2005
- IAAVR started Fellowship in 1996; first being during inauguration in 1996 at CARI, Izatnagar
- IAAVR made a MoU with Indian Journal.com for online availability of The Indian Journal of Veterinary Research
- IAAVR started first Conference and symposium in 1994 at IVRI, Izatnagar
- IAAVR coined and introduced the term "Indian Veterinary Congress" and replaced the usual trend of Conference
- IAAVR provided a Hindi version of abstract in the Indian J. Vet. Research from (1992-2001)
- IAAVR conducted interface with field veterinarians with support of Intas Pharmaceuticals during First Indian Veterinary Congress in 2000 held at IVRI, Izatnagar

Award Ceremony: A number of distinguished veterinarians were honoured for their outstanding contributions.

Sl. No.	Name of Award	Recipient	
1.	Major (Mrs) Malika Trivedi IAAVR Award	Dr Kusmakar Sharma, Ex-DG (HRD) ICAR	
2.	Fellowship of IAAVR	Dr Sarman Singh AIIMS, New Delhi	
	-do-	Dr D.V.R. Prakash Rao, Chairman Prakash Food & Feed Milk Pvt. Ltd., Chennai	
	-do-	Dr Abhjit Mitra Director, ICAR-NRC on Mithun	
	-do-	Dr D. Thyagrajan Ex-Director Extension, TANUVAS Chennai	
	-do-	Dr Sayed Basharat Ahmed Shah, Germany	
	-do-	Dr A.K. Tewari, Head Division of Standardization ICAR-IVRI, Izatnagar	
	-do-	Dr Veer Singh Prof. & Head, Deptt. of Pathology, College of Veterinary Science, S.K. Nagar	
3.	Mrs Vimal Srinivas Kshirsagar Memorial Lady Veterinary Award	Dr Rajshree Gandge Prof. Deptt of Micro COVSc, Mumbai	

4.	Shyama Singh Balamati Devi Memorial Award	Dr B.P. Mishra JD (Res) IVRI, Izatnagar	
5.	Excellence Award Canine Management, Medicine & Training	Commandant & All Ranks Vet, SSB, GoI, New Delhi	
6.	IAAVR Field Veterinarian Award	Dr Indresh Narayan Kulshrehtha	
7.	Life Time Achievement Award	Dr Manmohan Singh Special Chief Secretary, Govt. of A.P.	
8.	Distinguished Vet. Award	Dr R.K. Singh Director ICAR-IVRI, Izatnagar	
9.	Dr Rishendra Verma Young Scientist Award	Dr Biendra Kumar Prusty Research Scholar Institute of Life Science Bhubaneswar	
10.	Dr Rishendra Verma Young Scientist Award (Consolation Award)	Dr Abhishek Scientist Division of Bact. & Micology ICAR-IVRI, Izatnagar	
11.	Gao Gyan Paritoshak Award	Dr D.M. Chavan Joint Commissioner, IAH & VB, Pune	
12.	IAAVR Merit Award	Dr Amit Kumar Asstt Prof., COVSc, Mathura	
13.	IAAVR Merit Award	Dr Lata Jain Scientist, ICAR-National Institute of Biotic Stress Management, Baronda, Raipur-493 225 Chhattisgarh	

14.	IAAVR Merit Award	Dr Harhsit Verma Asstt Professor Department of Vet. Microbiology College of Veterinary Science, Meerut	

FELICITATION AWARD

1.	**Dr P.K. Uppal**, Advisor, Chief Minister, Chandigarh, Punjab	
2.	**Dr M.P. Yadav**, Ex-Director, IVRI & Vice Chancellor, SBPUAT, Meerut	
3.	**Dr Nagendra Sharma,** Ex-Director (IVRI, CIRG, NDRI) & Vice Chancellor, SKUSAT, Jammu	
4.	**Dr Amresh Kumar**, Ex-Dean, COVSc (Pantnagar) & DG, KCMT, Bareilly	

Appreciation Certificate

1. Dr R.C. Patra, Dean, College of Veterinary Science, Bhubaneswar (Odisha)

Release of Publications

The following publications were released:

1. Research Abstract Compendium
2. One Health News Letter
3. Guidelines for Antimicrobial Standard in Livestock Healthcare
4. POLIVET-INTAS

Extracts from Inaugural Session

Dr S.N. Singh, President, IAAVR urged to have DIVA, recombinant vaccines. Knowledge should go directly to grass root level. Brazil can control FMD why not India? Coordination is must between different govt and private agencies. One Veterinary Model can change the Society..... Dr Singh said One health subject is talked and it is connected with animal and society IAAVR is the only association which interacts with all veterinary subject experts, professionals, industry, policy makers and research scientists.

Dr Rishendra Verma, Founder Secretary spoke that IAAVR is an exemplary example doing yeoman job bringing so many people together in a multidisciplinary approach which is the demand of largest National Agricultural Research System (NARS). Promoted field veterinarians, whole Indian industry about 90% sitting in the audience, there must be some reason behind this. Dr Verma in loud voice stated "we speak, we hear and translate our words into deliverable action and this has made industry proactive for their participation". Dr Verma raised the issue of parity for vets serving in different sectors including paramilitary forces. Somewhere there is parity, somewhere there is non-parity. Once it has been settled that there will be parity of vets with medicos, why this turbulence. Scientific societies should be recommending bodies as being represented by public and private sectors. Dr Verma reminded about National Commission on Agriculture of the year 1977 wherein there are some policy matters regarding for example tuberculin reactors animals, brucellosis but there has not been so far this Commission meeting. The ICAR hosted in 2011 a meeting of societies but so far there is no visibility of its recommendations and Dr Verma requested the ICAR to convene another meeting. There are no incentives to societies and no heed to recommendations of societies. It is for the first time in the history veterinary that a number of medical experts, OIE representative and paramilitary officers besides several eminent delegates are among galaxy of audience. Dr Verma appreciated ICAR to have launched schemes on important animal diseases and hoped that this support is continued.

Dr Manmohan Singh Guest of Honour congratulated to organisers and appreciated presence of several experts from different disciplines. Dr Singh voived that no FMD in Adhra Pradesh for last 02 years. Existing vaccines need some more reform in potency and longevity, logistic challenges to be addressed, economic losses because of disease should burden be reduced. In most draught affected areas, animal husbandry is better. Dr Singh also mentioned about doubling income in next 05 years and according to him a minimum of Rs.10000 farmers get from all soruces. According to Dr Singh, Brucellosis, FMD and Mastitis are areas in animal health management should be worked for early, timely and effective diagnosis

Dr Trilochan Mohapatra, Chief Guest, in his address said that organizers have planned the Congress with broader perspective. Such congregation require in depth discussion so the country is guided, the Council is guided with a blue print, road map with action plan. Efforts of

scientists led to eradication of rinderpest and attained milk production at first rank in the world. He expressed that One Health is far longer to go. Every 6 out of 10 animals disease in human and 3 out of 4 emerging diseases in human come from animals. Transition from animal to human, human to animal spread, colonizing mechanism are involved. It not only zoonotic continuum but soil, plant, human and animals are part of one health. Soils are deficient of micronutrients. Area specific mineral mixture eliminate atleast infertility problem. Amelioration of deficiency at the level of soil is essential as much as we talk of human and animal health. He said "we stand with tremenduous credit". The expectation of Secretary DAFD is need of thermostable FMD vaccine, a single dose vaccine for multiple disease. We develop technologies but it does not go to field. He cited example of artificial insemination may be 20 or 30%. Could we think of alternatives of developing a vaccine in fodder which goes as oral vaccine with advantages. He called upon to work on animal vaccines in plants. Dr Mohaparta referred about poultry Newcastle disease vaccine approved by USDA produced in tobacco culture. Dr Mohaptra urged to understand genomic interventions and genomic modification which would boost animal productivity and animal health management. He referred about zygote crisper technology, resistant pigs in which the gene for African swine fever has been deleted by genome editing technology at University of Edinburg, Roslin Institute. Attempts have been made for hornless cattle. We have huge sequence data, genome sequencing, genes predicts to the extent of 80% accuracy, transciptomes sequences, do we have expertise. Precision agriculture and animal health management, we should have expertise to silent the gene or edit or mutate or delete to make the animal resistant. We may mutate receptor of pathogen ligand. 80% are non descript where our health management has not reached, resistance stock, carrier animals who do not show sign of diseases, stress management sequence data, genetic enhancement of local breeds without injecting exotic genome. Dr Mohapatra also mentioned about sex sexing, Outside India they need males, muscles better that is meat. We want females. We have cloning- proof of concept. We have not gone beyond that and could not take commercial advantage. We need to clone plus bulls.

Dr Raj Kumar Singh in his presidential address at the outset mentioned about development of Rinderpest vaccine in 1927 by IVRI and now at the end of rinderpest development of competitive ELISA for rinderpest. In addition, recombinant bluetongue antigen (VP7), evaluation of Indian/ crossbred breed for SNP's with relation to productivity, A1 and A2 status of herd, thermostable, combined PPR and goat pox vaccine, DIVA vaccine for brucellosis, DIVA for Classical swine fever virus, IBR but no commercial taker.

Plenary Session Report

Chairman : **Dr T. Mourya**

Co-Chairman : **Dr Arun Atrey**

Rapporteur : **Dr M. Karikalan**

1. Regulation of Veterinary Para Professionals in India - **Maj Gen ML Sharma** (Retd), CEO Brooke India

I. Discussion on livestock census, technical vet and paravet

II. The existing Vet: Animal ratio is 1: 15 thousand which need to be brought down to 1: 3 thousand for better health care and productivity

III. Disparity between number of Para-Veterinary training schools vis-à-vis livestock population in various states

IV. Acute Shortage of Qualified Paravets

V. Maharashtra and Rajasthan having highest no. of paravet schools and variation among paravet education standards

Recommendations: National Level regulatory Authority, Strengthening of Veterinary Service Delivery System & Extension Services by linking registered Paravets & Inseminators with Veterinary Hospitals/ AI Centres, Institution of State level Para-Veterinary Council through legislation to regulate Paravets and Para-Veterinary Institutions

2. Presentation on Dog-**Dr A.K. Sinha, Seema Suraksha Bal(SSB)**

I. Security Scenario-Civil Crime, Terrorism, Transborder Crimes, Trade n Transit Security

II. Canine Capabilities- Physical and tactical traits

III. Organization of Dog Squads- In 2005, SSB was the 1st Paramilitary Force to be authorized dog squad by MHA

IV. Emerging Challenges- Crowd Control, Synthetic Drug Detection, Illicit Liquor Detection, Underground Cable leak detector dog, Gas / Oil pipe leak detector dog, Wild life Crime Control (Detection), Arson Detection Dog

3. Improving coordination of global research on animal health: the OIE contribution in the STARIDAZ International Research Consortium- **Stefano Messori OIE, Paris**

Discussion on World Organisation for Animal Health (OIE) (members, OIE Specialist Commissions, Reference Centres, OIE publications, OIE Specialist Commissions**,** Global Strategic Alliances for the Coordination of Research on the Major Infectious Diseases of Animals and Zoonoses (STAR-IDAZ IRC), OIE role in "**S**ecretariat for the **I**nternational **R**esearch **C**onsortium on **A**nimal **H**ealth" (SIRCAH),

Future focus: Vaccinology collaborative project, Developing bTB research roadmaps, in collaboration with Global Research Alliance for bovine TB, Establishing Working Groups on the first selected priority diseases, PRRSV Research Roadmap.

4. Food Safety Law in India: Overview of New Regulations and Policies to further enhance safeguards against Antimicrobial Resistance (AMR)- **Dr Ranum Dabas Scientist IV (1) FSSAI, New Delhi**

Discussion on Food Safety and Standards Act, 2006 and its objectives, Rules and Regulations and Upcoming Regulations, India's Food Regulatory System, Enforcement & Surveillance and New Initiatives by FASSI.

5. Emerging zoonotic viral infections and bio-safety measures- **Dr T. Mourya, Director, National Institute of Virology, Pune**

Discussion on overview of zoonotic infections (61% new emerging zoonosis from animals), laboratory biorisks (Increasing laboratory based infections), Chain of Infection & risk management, Routs of infection in the lab**,** biosafety issues and its standards and classification of agents based on risk.

SERVICE DELIVERY FOR SMALLHOLDER LIVESTOCK FARMERS

Jointly Organized by

Global Alliance for Livestock Veterinary Medicine (GALVmed) and Indian Association for the Advancement of Veterinary Research, Izatnagar-243 122 (UP)

at

ICAR-Indian Veterinary Research Institute
Izatnagar-243 122 (UP)

April 9, 2017

Chairman : Dr A.K. Garg, Joint Director (E E) IVRI

Co-Chairman : Dr Mahesh Chander, Head, (EE), IVRI

Moderator : Dr Mamta Dhawan, Regional Manager-South Asia, GALVmed

Rapporteur : Dr Rupasi Tiwari, Principal Scientist (EE), IVRI

Coordinator : Dr Rahul Srivastava, GALVmed

Time	Topic	Presenter
10:30-10:35	Welcome, Introduction and setting the scene	Dr Mamta Dhawan
	Theme: Service delivery experience sharing	
10:35-10:45	Challenges and Opportunities in animal health service delivery to smallholder livestock keepers in South Asia	Dr NityaGhotge, Anthara, Maharashtra
10:45-10:55	JSLPS experience sharing in service delivery to Smallholder livestock farmers in Jharkhand	Dr Praveen Kumar, JSLPS, Jharkhand
10:55-11:05	Experience sharing in small animal healthcare service delivery in Chhattisgarh	Dr Gautam Roy, AHD, Government of Chhattisgarh
11:05-11:15	Sustainable Livestock Production in resource constrained area	Dr BabluSundi, AHD, Government of Jharkhand
11:15-11:25	Animal health service delivery – A Perspective from Meghalaya	Dr K B Sahkhar, DAH, Meghalaya
11:25-11:35	Discussion on the presentations	
Theme: Policy, Partnership and Market		
11:35-11:45	Delivery of Livestock Health Products and Services- Policy perspective	Dr Mamta Dhawan, GALVmed
11:45-11:55	Scope of public private partnership and social innovators	Dr Mahesh Chander, Head (EE), IVRI
11:55-12:05	Market Development Opportunities in Smallholder animal healthcare in South Asia	Dr Rahul Srivastava GALVmed
	Livestock Service Delivery through Mobile Veterinary Units (MVUs) in Odisha: An analysis of Cosntraints	Anupama Jena
12:05-12:15	Discussion on the presentations	
12:15- 1:00	Panel Discussion : Moderator Dr Mamta Dhawan **Panellists':** 1. Dr Kusmakar Sharma, Ex-ADG (HRD) & Head (EE), IVRI 2. Dr Y.P. Dabas, Director, Extension, GBPUA&T, Pantnagar 3. Dr D. Thyagarajan, Ex-Director, Extension TANUVAS, Chennai 4. Dr B.P. Singh, Principal Scientist (EE), IVRI 5. Mr. VijeyTeng, Sr Vice President, INTAS 6. Dr Mukund Kadam, AP, Nagpur Veterinary College, Maharashtra 7. Dr Prabhat Pandey, JD Planning GoJ, Jharkhand 8. Dr V.K. Sachan, GoUP, Uttar Pradesh 9. Dr Ajay Kumar, BRLP, GoB, Bihar 10. Dr Shushmita Parai, Heifer India	
1:00-1:15	Chairman's Conclusive remark	Dr A.K. Garg Joint Director (EE), IVRI
1:15	Vote of thanks	Dr Gautam Roy, AHD, Government of Chhattisgarh

RECOMMENDATIONS

1. ***Efficient veterinary service delivery for smallholder livestock farmers and keepers***

- Considering the less number of trained veterinarians to serve the massive livestock population, para professional and community animal health workers (CAHW) are required to extend the animal healthcare services to the remotely placed smallholder livestock farmers and keepers.
- As per requirement, State government should recognize and regulate the private paraprofessionals and CAHWs to contribute as non-state actors in appropriate veterinary service delivery based on their skills and trainings.
- Standardized training module with common curriculum, time duration, norms/ guidelines and criteria with certification programmes from agencies like Agriculture Skill Council of India (ASCI) for the CAHWs/ Pashu Sakhis need to be developed with provisions for constant upgrading of knowledge.
- Pro-poor inclusive policies need to be developed (like dispensing from private mobile facilities including door step dispensing by licenced para professionals and CAHWs etc)
- It is necessary to clearly define the scope of activities of CAHWS so that they complement the activities of veterinarians. eg CAHW only extend vaccination and first aid services to backyard poultry and small ruminants.
- Pashu sakhi/ Community animal health workers model for health services to the Small ruminant, pig and poultry has proven to be a successful model in Jharkhand, Odisha, Rajasthan and needs to be explored in other states for sustained health service delivery to the small holder livestock owners.
- Considering the public health concern and biosecurity aspect, paraprofessional and CAHW must be brought under legal framework (VCI or a new body).

2. ***Availability of affordable and appropriate products (medicines, vaccines and nutritional supplements) for smallholder livestock farmers and keepers***

- Availability and access of need based veterinary products for smallholder livestock keepers and farmers at affordable cost need to be ensured by coordinated efforts of all stakeholders in livestock value chain.
- Research efforts need to be made on developing small dose packs for vaccines, thermotolerant vaccines, multiple disease vaccines, affordable feed supplements for small ruminants, piggery enterprises and backyard poultry.
- It is essential that State animal husbandry departments and commercial organizations have a strong linkage with the research institutions for technology backstopping
- Fee based services should be initiated for various services of state animal husbandry departments, since pilot projectson paying capacity of the small holder farmers havebeen proven successfully

3. ***Increasing awareness about smallholder sector's contribution to the national economy.***

- Public-Private-Partnership can be implemented by states in the areas of animal breeding, health care, product processing, slaughter houses since the state department is usually struggling with shortage of funds/human resources and can't deliver services in required quantity and quality.
- Mobile Agro-vet clinic has proven to be a successful model in resource constrained area of Jharkhand and can be replicated in other states as well.

OBJECTIVES

Goal of this session is to deliberate upon the following issues to come up with ways to surmount challenges and explore opportunities

1. Efficient Veterinary services delivery for smallholder livestock farmers and keepers
2. Availability of affordable and appropriate products (medicines, vaccines and nutritional supplements) for smallholder livestock farmers and keepers
3. Increasing awareness about smallholder sector's contribution to the national economy.

SCIENTIFIC SESSION

GENOMIC INTERVENTIONS IN ANIMAL HEALTH & PRODUCTION

Dated: 8th April 2017 (Time: 2.45 P.M. to 6.15 P.M.)

Venue: Committee Room, JD(R), ICAR-IVRI

Chairpersons : **Dr Arjava Sharma and Dr B.P. Mishra**
Co-Chairman : **Dr Vineet Bhasin**
Rapporteur : **Dr P.K. Rout**
Coordinator : **Dr Sanjeev Kumar**

Sl.No.	Topic	Speaker
1.	High Throughput Genotyping in Animal Improvement	Dr G.C. Joshi, Prof. & Head, Deptt. of Animal Biotechnology, Veterinary College, Anand
2.	Genomics in Animal Health & Production	Dr R.K. Vijh, Principal Scientist, NBAGR, Karnal
3.	Seminal Plasma proteins as fertility biomarkers in bulls	Dr S. Deori, ICAR-National Research Centre on Yak, Dirang, Arunachal Pradesh
4.	Dynamics of Y chromosome and sperm genomics of domestic animal	Dr P.J. Das, ICAR-National Research Centre on Yak, Dirang, West Kameng District, Arunachal Pradesh-790101
5.	Transcriptomics comparison between the early and late age at first calving in buffaloes	Dr Ran Jeet Verma, ICAR-IVRI, Izatnagar-243122,
6.	Application of Proteomics for Biomarker Discovery in Livestock	Dr Ashok Kumar Mohanty, Principal Scientist , Animal Biotech. Centre, ICAR- NDRI, Karnal, 132001
7.	Understanding reproduction phenomena in animals in genomics way: Exploring possibilities for optimizing animal productivity	Dr T.K. Datta, Principal Scientist, Animal Biotech., Genomics Lab, Animal Biotech. Centre, NDRI, Karnal 132001
8.	Application of genomics in under-standing the evolution of buffaloes	Dr Vikas Vohra, Senior Scientist, ICAR-NBAGR, Karnal-132001
9.	Strategies for improving animal Production through the intervention of Reprogenomics	Dr Taru Sharma, Head, Division of Physiology & Climatology, ICAR-IVRI, Izatnagar-243 122
10.	Transgenic livestock: Present status and Prospects	Dr Abhijit Mitra, Director, ICAR-NRC on Mithun, Medziphema, Dimapur, Nagaland
11.	Understanding host response to pathogen : A Genomic Approach	Dr Ravi Kumar Gandham, Senior Scientist, ICAR-IVRI, Izatnagar-243 122
12.	Genomic analysis and biomarkers for improving fertility in farm animals	Dr Suneel Kumar Onteru, Senior Scientist, Molecular Endocrinol, Functional Genomics & Systems Biology Lab, Animal Biochemistry Division, ICAR-NDRI, Karnal-132 001
13.	MHC class II DRB genotyping in Rohilkhandi Goats by PCR- RFLP and DNA sequencing	Dr Pushpendra Kumar, Principal Scientist, Division of Animal Genetics, ICAR-IVRI, Izatnagar-243 122
14.	Genetics and Genomics intervention for improving disease resistance studies in livestock	Dr P.K. Rout, Principal Scientist, ICAR-CIRG, Makhddom, Farah, Mathura-281122, UP
15.	CRISPR/Cas9 Mediated genome editing	Dr Mihir Sarkar, Principal Scientist, Div. of Physiol & Climatology, ICAR- IVRI, Izatnagar-243 122
16.	Production: From genetics to genomics and metagenomics	Dr V.K. Saxena, Principal Scientist, Avian Genetics & Breeding, ICAR-CARI, Izatnagar
17.	Genomic interventions for poultry improvement	Dr Sanjeev Kumar, Principal Scientist, Animal Genetics and Breeding, ICAR-CARI, Izatnagar

A total of **16 papers were presented**, which included papers on possible genomic intervention in livestock production, reproduction and health. Specifically papers on genomic application for animal improvement, reproductive genomics, proteomics, biomarker development, disease resistance, metagenomics and CRISPER-Cas9 mediated genomic editing and transgenics were presented.

RECOMMENDATIONS

1. Accurate phenotyping for different production traits, disease resistance traits and adaptability traits.
2. Reference population to be establishment in different species to carry out genomic selection effectively.
3. Buffalo SNP chip should be utilized to screen and sequence Murrah buffalo population in the country.
4. Biomarker development for product quality, fertility should be approached through proteomics.
5. Cloning of elite animals showed be standardized to produce superior male animal for propagation of quality germplasm.
6. Genome editing technique needs to be used for producing genetically modified animals for desired traits.

SCIENTIFIC SESSION

ANTIMICROBIAL RESISTANCE

Dated: 8th April 201

Venue: Dr K.C. Hall, AN Division, IVRI

Time: 2.45 P.M. to 6.15 P.M.

Chairman	:	Dr Sunil Gupta
Co-Chairman	:	Mr. Vijay Teng
Rapporteur	:	Dr D.J. Kalita
	:	Dr Samiran Bandyopadhaya
Convener	:	Dr B.R. Singh
Panelists	:	Dr Amit Kumar Singh (ICMR), Dr Amit Kumar (Mathura), Dr S.S. Tongaonkar, Dr Sanjay Gavkare, Dr Jai Praksh, Neelam Taneja, Dr D.K. Dey, Dr R.C. Patra, Dr R.K. Bagherwal, Dr C.S. Sharma, Dr Prithuviraj, Dr Vikas Pathak

Sl.No.	Topic	Speaker
1.	Industry Perspective and Initiatives with respect to AMR	Mr. Vijay Teng Sr Vice President, INTAS Pharma, Ahemdabad
2.	Emergence of AMR in livestock: changing scenario and burgeoning crisis	Dr Samiran Bandyopadhyay ICAR-IVRI, ERS, 37 Belgachia Road Kolkata 700 037
3.	Status of antimicrobials use in poultry	Dr Ajit Singh Yadav Principal Scientist, Avian Medicine Section, ICAR-CARI, Izatnagar-243122 (U.P.)
4.	Antimicrobial resistance related to Veterinary use of Antibiotics	Dr D.J. Kalita, Technical & Regulatory Affairs, Zydus Animal Health, Ahemdabad
5.	Antimicrobials in Animal Health	Dr Nitin Bhatia Sr Gen Manager Regulatory & Tech Affairs, INTAS Pharma, Ahemdabad
6.	Fecal carriage of carbapenem- resistant, multidrug resistant and extended spectrum beta-lactamase producing (ESBL) *E. coli* isolates from sloth bear (*Melursusursinus*)	Dr O.R. Vinodh Kumar Division of Epidemiology, ICAR-Indian Veterinary Research Institute, Izatnagar-243 122 (U.P.)

The meeting was started under the chairmanship of Dr S. Gupta, Additional Director, NCDC, New Delhi and Mr. Vijay Teng, Sr. Vice-President, INTAS Pharmaceutical, Ahmadabad acted as Co-chairman.

At the outset, the Chairman congratulated the organizers of IAAVR for conducting a scientific session on AMR, the burning problem faced by the medical and veterinary scientific community and he briefed the house about the importance of AMR. Mr. Teng, Co-chairman also expressed the willingness of the pharmaceutical industries to resolve the issue and how they can play a role for containment of AMR.

Dr Sunil Gupta, Additional Director, NCDC gave a presentation on "AMR containment: country response" where he explained the role and subsequent response of our country to control AMR. With national action plan in process from Indian side he briefed the house about the involvement of all the eleven ministries, Govt of India to streamline the workforce. He also explained the house how AMR is spreading beyond the human health care premises and spreading to the livestock and community in recent years. He presented the major contributing factors for development of AMR and its possible impact. In his deliberation he showed the global trend of MDR pathogens like ESBLs, MRSA, VRSA and CRE. He also briefed the house the results of different laboratories under AMR network programmes operational from NCDC and ICMR. He explained that inadequate treatment of the effluents from the pharmaceutical industries could play a major contributing factor for development of AMR. He stressed upon the need of affordable diagnostics to help the clinicians avoid unnecessary use of antibiotics. He put forward the urgent need to develop the National AMR containment authority with flexi funding which can work upon a mission mode to control AMR.

Dr Vijay Teng, Vice-Chairman, Intas Pharmaceuticals stressed upon the development of new and cost-effective antimicrobial agents as this can help the resource poor farmers of our country. He also spoke for the need of alternative therapeutics of herbal origin, probiotics, vaccines to minimize the use of antimicrobials in animals. He emphasized on the need of cost-effective diagnostics of animal diseases so as to help the clinicians control the unnecessary use of antibiotics. Dr Teng mentioned that national level education awareness campaign on

AMR among the farmers, veterinary assistants/paravets, veterinarians and animal handlers can help a lot to understand and resolve the problem.

Prof. P.K. Uppal, former Director, ICAR-NRC Equine was present during the deliberation and he told the need of safe animal for safe food and ultimately safe human life. He explained how the three are interrelated.

Dr Vishal Diwan, Associate Professor, R.D.G. Medical College, Ujjain presented on the occurrence of drug resistant *E. coli* in children (under 5 years of age) and their environment in rural areas of Ujjain where he showed the higher occurrence of such pathogens among the children and 30% of the *E. coli* isolated from household and drinking water were found drug resistant whereas less than 20% of the *E. coli* isolated from domestic animals were found drug resistant. However, such frequency was less among the samples collected from storage or outside water. He showed a picture of the prescription practice pattern in the said area. Of 15635 prescriptions scrutinized by the workers over two years, almost 73% of them mentioned at least one antibiotic with steroids. He spoke that in many cases the patients were under dosed without completion of the full course of antibiotics.

Dr Nitin Bhatia, Sr. General Manager, Intas, Ahmadabad gave a presentation on "Antimicrobials in animal health" where he showed how the demand for food of animal origin is increasing with leaps and bounds with increasing population. He showed that despite this fact the usage of antibiotics is far less in animals in India when compared to other countries like China or USA. He tried to explain few factors relating to misconceptions in usage of antimicrobials in animals and role of animals for spreading AMR.

Dr A.S. Yadav, Principal Scientist, ICAR-CARI, presented the different ways of using antibiotics in poultry including the use of antimicrobials in premixed feed and how they can play a role in development of AMR. He also pointed out the heavy chick mortality as one of the major reasons for higher usage of antimicrobials in poultry. Nevertheless, he admitted that no data is still available on quantity of antimicrobials used in poultry in India.

Dr D.J. Kalita from Zydus Animal Health gave various references of the scientific reports which failed to trace back the possible transfer of AMR pathogens from food animals to human beings. He also tried to undermine the role of medicated feed additives in emergence of AMR.

Dr Samiran Bandyopadhyay, from Eastern Regional Station of ICAR-IVRI, Kolkata depicted the status of drug resistant pathogens in eastern and north-eastern India. He also pointed out that the detection of VRSA or CRE in animals might possibly indicated towards reverse zoonosis as these groups of drugs (carbapenem and glycopeptides) are not generally used in animals. He explained that the carriage of multiple drug resistant cassettes in the integrons, plasmid or other transposable elements in such pathogens is playing a major role for spreading of antibiotic resistant genes. He depicted the efficacy of some of the alternative therapeutics (alkaloids/ nano particles) against such pathogens which he tested in his laboratory.

Recommendations:

1. Strict compliance of WHO, OIE and FAO guidelines for regulating the usage of antimicrobials in livestock and food animals
2. The veterinary diagnostic facilities at the grass-root level needs to be strengthened urgently for avoiding the unnecessary or exuberant usage of antibiotics in animals.
3. Stringent bio-security measures in the livestock farms need to be put in practice.
4. Over-the counter sale of the drugs and treatment of the animals other than the veterinarians need to be curbed by implementation of necessary laws or regulation.
5. Development of alternative therapy and use of probiotics for controlling infections instead of antibiotics need to be promoted and research thrust should be given for exploring novel methods to tackle the problems.
6. The veterinarians, paravets, chemists and farmers need to be sensitized about the gravity of the problem and its possible consequences by mass awareness programme.
7. Surveillance and monitoring need to be carried out to understand the real status of AMR in livestock in form of network project with establishment of standard operating procedures for detection of drug resistant pathogens of animal origin in ICAR laboratories.

or

Development of standard operating procedures for detection of drug resistant pathogens of animal origin in ICAR laboratories to strengthen the surveillance and monitoring to understand the real status of AMR in livestock in form of network project mode.

SCIENTIFIC SESSION

ONE HEALTH

Dated: 8th April 2017-03-28

Venue: DR F. J. WARTH COMMITTEE ROOM, AN Division, IVRI

Time : 2.45 P.M. to 6.15 P.M.

Chairman : Dr Ashok Kumar
Dr Sarman Singh

Co-Chairman : Dr Neerav Koherwal

Rapporteur : Dr Bhanita Devi

PANELISTS: Dr Anupam Goel, Dr A. Mishra, Dr Bharti Singh, Dr Pradeep Kumar, Dr Charan Kamal Singh

Sl.No.	Topic	Speaker
1.	Mycobacteria of Zoonotic importance: with special emphasis on *Mycobacterium avium subspparatuberculosis*.	Prof. Sarman Singh, Head, Div. of Clinical Microbiology & Molecular Medicine, AIIMS New Delhi,
2.	Genomics of Tuberculosis: A BIG solution to a complex problem	Dr Anirvan Chatterjee, Post Doc., IIT, Bombay
3.	Isolation of NTM from human and environmental samples using paraffin baiting technique	Dr Rahul Narang Prof. Microbiol& Secretary Indian National Working Group on NTM, MGIMS Sevagram
4.	Paragonimiasis: A Neglected Disease	Dr V. Khamo Health Care Laboratory and Research Center Naga Hospital Authority, Kohima, Nagaland-797 001
4.	Economics of TB treatment of animal cow and buffaloes	Dr Indresh Kulshreshtha 102, Yashodhara Apt, Shivaji Road Panvel, 410206 (M.S.)
5.	History, Benefits and Economics of Chemo-therapy/ chemoprophylaxis of Animals with TB	Dr Ashok Kale G11, Karan Green Society, near Rosary School, Warje Pune-411058
6.	*M. tuberculosis* complex specific biomarkers for diagnosis of bovine tuberculosis in cattle	Dr P. Dandapat Senior Scientist, ICAR-IVRI, Eastern Regional Station, Kolkata, West Bengal
7.	Residue Monitoring of Ciprofloxacin in pork of North East India	Dr D.C. Roy Department of Pharmacology and Toxicology, College of Vet. Sci., AAU, Khanapara, Guwahati-781022, Assam
8.	Production & standardization of purified protein derivative (PPD) Bovine tuberculin from Indigenous strain *Mycobacterium bovis*	Dr Rishendra Verma Dr Bhanita Devi Mycobacteria Laboratory Div. of Bacteriol. & Mycology IVRI, Izatnagar-243 122 (U.P.
9.	Implications of *Trichinella* and other meat- borne parasitic zoonoses	Dr Hira Ram Div. of Parasitology, ICAR-IVRI, Izatnagar-243122
10.	Evaluation of antibacterial potential of various essential oils against foodborne pathogens	Dr Madhu Mishra Food Microbiol. Lab, Division of Livestock Products Technology, Indian Veterinary Research Institute, Izatnagar-243 122 (U.P.)

1. Dr Sarman Singh-" Mycobacteria of zoonotic importance with special emphasis on *Mycobacterium avium subsp. Paratuberculosis*"

The talk was dedicated to **On world-one health**. Described the zoonotic disease, reverse zoonosis, Mycobacterial infection in cattle and elephant. Diagnosis, risk factor of *M.bovis* infection, problems of bovine TB control in India. He also delivered about MAP transmission, presence of MAP in milk and milk products. He also discussed about Crohn's disease. Differentiation between intestinal TB and Crohn's disease. Diagnosis of Crohn's disease. He opined that Good Laboratory Practice (GLP), processing of specimen correctly and purity of water is most important.

Recommendation:

TB is common to animal but it is a neglected disease, therefore research on animal TB should be taken on priority.

2. **Dr Rahul Narang**-" **Isolation of NTM from human and environmental samples using paraffin baiting technique**"

In his experiment histology grade paraffin was used which is a sole source of carbon and energy. Paraffin baiting technique was first used by Sohngen in 1913. He isolated NTM from stool, sputum and blood. He suggested the comprehensive study of patient and environment, phenotypic identification and gene sequencing (best method).

Recommendation:

TQM (Total Quality Management) in mycobacterial lab is essential. WHO endorsements are IGRA (2008) and TB LAMP (2016).

3. Dr Indresh Kulshrestha- "Economics of TB treatment of animal cow and buffaloes"

He discuused about the treatment, diagnosis and prevalence of TB.He recommended that segregation is important, reactor and non-reactor animal should be treated by INH simultaneously. But his work was under trial and not under CPCEA guidelines which lead to controversy among the audience.

4. Dr Ashok Kale "History, Benefits and Economics of Chemotherapy/ chemopro-phylaxis of Animals with TB"

He discussed about bovine TB, true nature of TB infection, how to measure burden of TB, obstacles in INH treatment. But his work was not under CPCEA guidelines which lead to controversy among the audience.

Recommendation:

The view point for INH treatment of cattle need a thorough discussion for a control trial subject fulfillment of regulatory requirements.

5. Dr V. Khamo-" Paragonimiasis: A Neglected Disease"

Paragonimiasis is a lung fluke, which is misdiagnosed as tuberculosis, caused due to eating raw or uncooked crab. In NE region, 1st report was from Nagaland. She discussed about the clinical manifestation, diagnosis and treatment of paragonimiasis.

Recommendation:

To eat uncooked crab, create awareness among clinician, common people. But serology for diagnosis need to be developed and identification of snail is yet to be done.

6. Dr Hira Ram "Implications of *Trichinella* and other meat- borne parasitic zoonoses"

Discussed about the trichinellosis, cysticercosis and Toxoplasmosis. Causative agent, worldwide distribution, Indian scenario, Diagnosis,and recommendation of those diseases such as health education, meat inspection.

7. Dr P. Dandapat *"M. tuberculosis* complex specific biomarkers for diagnosis of bovine tuberculosis in cattle"

Discussed about the global problem of TB,but zebu cattle are resistant. Single TB test is recommended in India. Discussed about the evaluation of diagnostic marker namely ESAT-6, CFP-10, MPB83, MPB-70.Screening by IFN-gamma test, AM and PM samples. Biochemical and molecular characterization of isolates.

Recommendation:

In-vivo study using combination of bio mass be explored for use in field based tuberculosis testing.

8. Dr D.C. Roy –"Residue Monitoring of Ciprofloxacin in pork of North East India"

Discussed about the detection of residue of Ciprofloxacin in pork meat of Assam, Manipur and Nagaland. 200 samples were collected and detected by HPLC method.

Recommendation:

Pork sample contains below the MPL (Minimum Permissible Limit) of ciprofloxacin. Pork samples are fit for animal consumption.

SCIENTIFIC SESSION

NEW GENERATION VACCINE DIAGNOSTICS

Dated: 9th April 2017

Venue: Main Auditorium, IVRI

Time : 9.00 A.M. to 12.15 P.M.

Chairman : Dr M.P. Yadav

Co-Chairman : Dr B.N. Tripathi, Dr P.K. Malik

Convener : Dr A.K. Tewari

Rapporteur : Dr P. Dhar

PANELISTS: Dr S.N. Singh, Dr D.K. Dey, Dr Lalit Belwal, Dr B.S. Karada, Dr Sanjay Gavkare, Dr S.S Tongoankar, Dr Prtithuviraj, Dr Salaudin Quereshi, Dr Vikramaditya Upamnyu, Dr Mayank Rawat, Dr I. Praksh, Dr D.J. Kalita, Dr Nitin Bhatia, Mr. Vijay Teng, Mr. Devesh Sharma

1.	Current status of Veterinary Drugs Standrads in IP and Road Map for Forthcoming IP 2018	Jai Prakash IP Commission Minsitry of Health & Family Welfare, Ghaziabad
2.	Impact of Rinderpest Eradication in India	D. Bardhan, R.K. Singh & Sanjay Kumar
3.	New Generation Veterinary Vaccines	A.K. Tewari Head Div. of Standardization IVRI, Izatnagar-243 122 (UP)
4.	H9N2 LPAI in Indian Subcontinent –should we be concerned?	Lalit M. Belwal Chief Technology Officer, INDOVAX, Gurgaon (Haryana)
3.	Newcastle Disease - Recent Perspective	Sanjay Gavkare Venkateshwara Hatcheries Pvt. Ltd., Ventri Biologicals, Vaccine division, Pune
4.	Rispoval-inactivated marker vaccine for prevention of infectious bovine rhinotracheitis in dairy animals	Vijay Muley Zoetis India Limited, 31, 3rd Floor, Kalpataru Synergy, Opp Grand Hyatt, Santacruz (E), Mumbai- 400055
5	Prevalence of infectious bovine rhinotracheitis in organized dairy farms in India	S. Patil ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Bangalore
6.	Status of equine vaccines, their advancements and vaccination in India	Nitin Virmani National Research Centre on Equines, Sirsa Road, Hisar 125 001, Haryana, India
7.	New generation infectious bovine rhinotracheitis (IBR) vaccine	Praveen K. Gupta Principal Scientist Division of Veterinary Biotechnology, ICAR-IVRI, Izatnagar-243122, (U.P.)
8.	New generation vaccines for *Clostridium* species	K.N. Viswas Division of Bacteriology and Mycology, ICAR-IVRI, Izatnagar-243122 (U.P.)
9.	Intra-dermal rabies vaccination in bovine: a life saving protocol	ONE Health" Team from Himachal
10.	Reverse genetics in designing new generation vaccines	C. Madhan Mohan Recombinant DNA Laboratory, Division of Veterinary Biotechnology, ICAR-IVRI, Izatnagar 243 122 (UP), Email: sohinimadhan@gmail.com
11.	Trends and research challenges in combating Infectious bursal disease of poultry	Sohini Dey Recombinant DNA Laboratory, Division of Veterinary Biotechnology, ICAR-IVRI, Izatnagar-243122, (U.P).

12.	Developing a safe and DIVA compatible *Brucella abortus* strain by altering LPS moiety	Pallab Chaudhuri Genetic Engineering Lab., Division of Bacteriology & Mycology, ICAR-IVRI, Izatnagar-243122, (U.P.), E-mail: pallab.chaudhuri@gmail.com
13.	Development of novel chemiluminescent Dot-Blot for the detection of Avian Reovirus	Deepak Kumar Division of Veterinary Biotechnology ICAR-IVRI, Izatnagar-243 122 (U.P.)
14.	Plant Based Vaccine for Veterinary Purpose	Sabita Behera Division of Bact. & Mycology, ICAR-IVRI, Izatnagar-243122
15.	Standardization and development of *Pasteurella multocida* inactivated adjuvanted vaccine against pig pasteurellosis.	Harshit Verma, College of Veterinary & Animal Sciences Meerut-250110
16.	*Brucella* induces constructive oxidative stress during immunization with *Brucella melitensis* vaccine	Amit Kumar, V.K. Gupta, Rajesh Mandil, A.K. Verma S.K. Yadav & Anu Rahal Deptt. of Vet. Microbiol, CVSc, Mathura-281001
17.	Canine parvovirus - 2 variants – new generation diagnostics and vaccines	S. Nandi CADRAD, ICAR-IVRI, Izatnagar-243 122 (UP)
18.	Detection of enterotoxigenic *E.coli* in neonatal diarrhoeic cross-bred calves by PCR technique	Satish Kumar Veterinary Clinics, College of Veterinary and Animal Sciences, Pantnagar-263145, U.S. Nagar, Uttarakhand
19.	Continuous *in vitro* cultivation of *Trypanosoma evansi*	A.K. Tewari, V. Jawalagatti, N. Bisht, Sudhakar, N. R. and B.C. Saravanan Division of Parasitology, ICAR-IVRI Izatnagar, U.P.

There were in all 18 presentations in the session.

Recommendations:

1. To focus on new generation vaccines with DIVA capability and combined/multi-component vaccines; but this should be need based and after proper study
2. To focus be on suitable delivery system for long lasting immunity, easy administration (oral-in feed fodder, water; inhalation- aerosol) in low dose to reduce cost of vaccine and vaccination
3. To focus on preventing vector borne disease by developing vaccine against vector (transmission blocking vaccine, TBV)
4. Emergency preparedness for exotic & emerging diseases using rDNA technology.
5. To develop policy for vaccination of animals in the face of disease outbreak
6. Virus strain matching should be done for developing vaccine against pathogen having frequent strain variations
7. More emphasis be given to control rabies in animals involving veterinarian, public health (medical) and local administration as it has been so far a neglected area

GENERAL SESSION

Dated: 9th April 2017

Chairman : Dr S.K. Karmore

Convener : Dr R.K. Barhaiya

Rapporteur : Dr Panch Kishore Bharti

Sl. No.	Topic	Speaker
1.	Prevalence of cardiac diseases in canines using electrocardiography and cardiac biomarkers	Sarita Devi Department of Veterinary Medicine, COVSc & AH, SDAU, Sardarkrushinagar
2.	Morphometrical Observations on the Heart of Prenatal Goat (*Capra hircus*).	S.K. Gupta, Department of Anatomy, College of Veterinary Science and Animal Husbandry, DUVASU, Mathura
3.	Conventional and molecular diagnosis of poultry mycoplasmosis	Bukte S.R., Department of Microbiology Bombay Veterinary College, Parel, Mumbai-400 012
4.	Molecular cloning and expression of recombinant Heat Shock Protein 70 (rHSP70) using prokaryotic expression system	Jaya, A. Paul, ICAR- ICAR, Izatnagar-243122 (UP)
5.	Ontogeny of basement membrane and peritubular myoid cells in testes of Indian buffalo	Ashritha Q Carlo, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab
6.	Our Pride Indigenous Livestock Breeds Depicted on Indian Postage Stamps	R. Somvanshi Emeritus Scientist (ICAR) National Animal and Veterinary Science, Educational Museum, ICAR-IVRI, Izatnagar-243 122
7.	Identification of tissue of cattle origin by species-specific simplex and real time PCR assays targeting mit. gene sequences	Dhananjay Kumar Div of Livestock Products Technology ICAR-IVRI, Izatnagar-243 122

1. Dr Archana from Department of Anatomy, DUVASU, Mathura delivered about the morphometrical observations on the Heart of Prenatal Goat (*Capra hircus*)
2. Dr Sarita Devi from Department of Veterinary Medicine, SDAU, Sardarkrushinagar presented the prevalence of cardiac diseases in canines using electrocardiography and cardiac biomarkers and concluded that prevalence of cardiac has not related with season however it was influenced as per age, diet habbit and exercise.
3. Dr Rajashree Gandge form Department of Microbiology, Maharashtra Animal & Fishery Sciences University presented about the conventional and molecular diagnosis of poultry mycoplasmosis and recommended that PCR technique used diagnosis was giving true prevalence.
4. Dr Ashritha Q Carlo from Guru Angad Dev Veterinary and Animal Sciences University, delivered about the Ontogeny of basement membrane and peritubular myoid cells in testes of Indian buffalo and concluded that gradual organization of basement membrane takes place from pre to post natal life.
5. Dr Dhananjay Kumar from Div of Livestock Products Technology, IVRI, presented about the identification of tissue of cattle origin by species-specific simplex and real time PCR assays targeting mitochondrial gene sequences and concluded that cattle species specific primer was designed based on variation in mitochondrial D-loop sequence.
6. Dr Jaya A. Paul, from ICAR-CARI delivered about the molecular cloning and expression of recombinant Heat Shock Protein 70 (rHSP70) using prokaryotic expression system.
7. Dr R. Somvanshi, Emeritus Scientist, National Animal and Veterinary Science, Educational Museum, IVRI presented about our pride indigenous livestock breeds depicted on Indian postage Stamps and concluded that 4 cattle breed, 4 horse breed , 4 dog breed and 1 poultry breed are used as Indian postage stamp by Govt. of India.

Rational and implication of use of antibiotics in clinical treatment

R.C. Patra
College of Veterinary Science and Animal Husbandry,
Orissa University of Agriculture and Technology, Bhubaneswar-751 003

The antibiotic has been described as small molecule made by a microbe that antagonizes the growth of other microbes for the first time by Selman Waksman way back in 1941. The development of fungus-derived penicillin, soil bacteria-produced streptomycin, chloramphenicol and tetracycline ushered in the antibiotic age from 1945–1955. Antimicrobials refers to microbes-derived antibiotics and non-microbial origin chemicals with potential to kill microbes or inhibit the growth of microbes, and are delivered to animals for a variety of reasons such as disease treatment, prevention, control, and growth promotion/ feed efficiency. The benefit and risk associated with use of antimicrobials in producing animals continues to be complex and controversial issue. Low and sub-therapeutic doses of antimicrobials play very important role in improving feed efficiency, growth, and prevention and control of the diseases. International market value of veterinary drugs (including antimicrobials) tremendously increased from$8.65 billion in 1992 to $20.1 billion in 2010 and in 2018, and it is expected to increase to $42.9 billion. However, the evolution of antibiotic resistance against important human and animal pathogens has rendered these original antibiotics and most of their successors largely ineffective. The golden age of antibiotics and their therapeutic advantages will soon come to an end, if suitable alternatives are not brought into force.

Meat and poultry producers routinely provide antibiotics to animals and birds to make them grow faster or stand them survive in crowded, stressful, and unsanitary conditions. When these drugs are overused by humans or animals, some bacteria become antibiotic-resistant, threatening the future effectiveness of these therapeutic agents. Consumer demand for chicken, turkey, pork, and beef raised without the routine use of antibiotics is growing fast. Motivated by personal health, environmental impacts, animal welfare, taste, and quality concerns, many consumers are seeking alternatives to conventional meat products, which are typically produced with the regular, ongoing use of antibiotics. Large-scale unregulated use of antibiotics in the poultry industry could be contributing to Indians developing resistance to antibiotics and falling prey to a host of otherwise curable ailments, according to a survey conducted by the Centre for Science and Environment (CSE). Pollution Monitoring Laboratory tested 70 samples of chicken in Delhi and NCR: 36 samples were picked from Delhi, 12 from Noida, eight from Gurgaon and seven each from Faridabad and Ghaziabad. Three tissues such as muscle, liver and kidneys were tested for the presence of six antibiotics widely used in poultry such as oxytetracycline, chlortetracycline and doxycycline (Tetracycline group), enrofloxacin and ciprofloxacin (class fluoroquinolones) and neomycin, an aminoglycoside. Residues of five of the six antibiotics were found in all the three tissues of the chicken samples. These residues were in the range of 3.37-131.75 µg/kg. Of the 40 per cent samples found tainted with antibiotic residues, 22.9 per cent contained residues of only one antibiotic while the 17.1 per cent samples had residues of more than one antibiotic.

Antibiotic Use in Livestock Practices

Antibiotic-resistant infections lead to longer illnesses, more hospitalizations, the use of antibiotics with greater side effects, and even death when treatments fail. Resistance results from the use of antibiotics in both human medicine and in animal agriculture. 80% of all antibiotics sold in the U.S. are used on cattle, pigs, and poultry, and other livestock, the vast majority were used to speed up growth and compensate for crowded, unsanitary conditions. In its recent report “Antibiotic Resistance Threats”, the Centre for Disease Control stated, “Up to half of antibiotic use in humans and much of antibiotic use in animals is unnecessary and inappropriate and makes everyone less safe. In the face of a looming health crisis caused by growing antibiotic resistance, many of the nations’s leading scientific and health-focused organizations have sounded the alarm over animal uses of these drugs.

Can Resistant bacteria harm us?

Antibiotics are widely used in food-producing animals. According to data published by FDA, there are more kilograms of antibiotics sold in the United States for food-producing animals than for people. Such use contributes to the emergence of antibiotic-resistant bacteria in food-producing animals. Resistant bacteria in food-producing animals are of particular concern because these animals serve as carriers. Resistance to antimicrobial agents is an increasing and serious problem. Judicious use of antimicrobial agents in humans will address only approximately 50% of use and will be insufficient to curb the accelerating upward trend in resistance. The largest non-human use of antimicrobial agents is in food-animal production, and most of this is in healthy animals to increase growth or prevent diseases. Evidence now exists that these uses of antimicrobial agents in food-producing animals have a direct negative impact on human health and multiple impacts on the selection and dissemination of resistance genes in animals and the environment. Children are at increased risk of acquiring many of these infections with resistant bacteria and are at great risk of severe complications if they become infected. Resistant bacteria can contaminate the foods that come from those animals, and people who consume these foods can develop antibiotic-resistant infections. Scientists around the world have provided strong evidence that antibiotic use in food-producing animals can harm public health through the following sequence of events: Use of antibiotics in food-producing animals allows antibiotic-resistant bacteria to thrive while susceptible bacteria are suppressed or die. Resistant bacteria can be transmitted from food-producing animals to humans through the food supply. Resistant bacteria can cause infections in humans. Infections caused by resistant bacteria can result in adverse health consequences for humans.

Overuse of Antibiotics in Food Animals Threatens Public Health

Antibiotics are widely used in food-producing animals. This use contributes to the emergence of antibiotic-resistant bacteria in food-producing animals. These resistant bacteria can contaminate the foods that come from those animals, and persons who consume these foods can develop antibiotic-resistant infections. Antibiotic resistance is an important public health issue that requires coordinated action in both human and animal medicine. Preventing human infections with resistant bacteria that come from the food supply requires a multifaceted approach by many stakeholders. Together, we must prevent and control the spread of disease-causing bacteria carried by food-producing animals; Identify control points that can restrict the transfer via food, soil, and water of antibiotic-resistant bacteria from agricultural settings; Develop better diagnostic tools to detect resistance rapidly and accurately; Detect and respond to changes in resistance; Increase our understanding of which antibiotic uses in food-producing animals contribute most to the development and persistence of antibiotic resistance in bacteria.

Tracking and Reducing the Public Health Impact

Everyone has a role to play in tackling development of resistant bacteria and creating a multi-million dollar market for meat raised without antibiotics. Antibiotics must be used judiciously in humans and animals because both uses contribute to the emergence, persistence, and spread of resistant bacteria. Resistant bacteria in food-producing animals are of particular concern. Food animals serve as a reservoir of resistant pathogens and resistance mechanisms that can directly or indirectly result in antibiotic resistant infections in humans. For example, resistant bacteria may be transmitted to humans through the foods we eat. Some bacteria have become resistant to more than one type of antibiotic, which makes it more difficult to treat the infections they cause. Preserving the effectiveness of antibiotic drugs is vital to protecting human and animal health.

Consumers care and concern

Meat raised without the routine use of antibiotics is going main stream. American consumers now regularly point to the misuse and overuse of antibiotics in livestock production as a top sustainability concern. A Consumer Reports survey found that 86 %of consumers polled said that meat and poultry raised without antibiotics should be available in their local supermarket and more than 60 % of respondents said they would be willing to pay at least $0.05 cents per pound more for it. Nearly 40 % said they would pay $1 or more per pound. Large meat producers and buyers (n=26) switching to production systems and supply chains that don't rely on the routine use of antibiotics regularly cite consumer demand as a major driver of their decision. Hence, it is the job of each one to investigate the health impact of resistant infections in humans; and promote judicious use of antibiotics to extend their useful life.

Adverse effect on animals:

The misuse of antibiotics in animal leads to range of adverse effects including toxicity, treatment failure and development of antimicrobial resistance. The consequences of antibiotic resistance in bacteria are basically the same in human and veterinary medicine. Loss of effective antibiotic treatments through resistance will cause suffering for the affected individual, regardless of whether it is a human being or an animal. There will also be economic consequences through increased treatment cost in animal and human health care. These costs are likely to be much higher in human healthcare because of the more advanced procedures and treatments are being employed. However, in up-to-date companion animal healthcare, the degree of knowledge and skill is high and advanced with use of costly procedures and prolonged treatments. Nevertheless, suffering of the individual animal and the overall costs in companion animal healthcare can be limited by the possible and relevant alternative to euthanize seriously sick or old animals. It is a normal procedure to put animals reared for food production down where the cost of treatment goes beyond the benefit in economic terms. Loss of access to effective therapy will also lead to economic losses due to reduced productivity of the animals, and loss of effective therapy in human healthcare is also associated with losses of productivity and subsequently to societal costs.

Many national and international organizations, associations and federations associated with animal, human and public health have begun to develop guidelines, principles and other activities on responsible use of antibiotics. Guidelines for the responsible use of antimicrobial agents in veterinary medicine include a set of practical measures and recommendations intended to prevent and/or reduce the selection of antimicrobial resistant bacteria in animals, with the following aims:

a) To maintain the efficacy of antimicrobial agents and to ensure the rational use of antimicrobials in animals with the purpose of optimizing efficacy and safety in animals- Scientific and technically-directed use of these compounds are the responsibility of professionals with the required expertise. The clinician must understand the pharmacodynamic principles of the antimicrobial they are prescribing, including the effects on the host status, pathogen type and medicine properties. The prescribing veterinarian must understand the health status of the patient, including immune status, and identify the target pathogen including any known resistance issues. They must understand the antimicrobial method of action, e.g. bacteriostatic and bactericidal mode of killing; time or concentration dependent killing, and the spectrum of activity; if the organism known, suspected or historically susceptible. Furthermore, the prescribing veterinarian must consider the pharmacokinetics of the antimicrobial to be used, including the route of administration, the volume to be administered, medicine distribution in the target species, half life and clearance rates, distribution and elimination characteristics, including any barriers to penetration and the impact of disease on the action of the medicine. The prescribing veterinarian must further more understand the products and preparations available that may be suitable to prescribe. This includes an in depth knowledge into the data sheet for the product and particularly any limitations therein, specifically, limitations in target species, dose rates, routes of administration, frequency of administration, length of course of treatment and the withdrawal times for re-entering the food chain. The prescribing veterinarian must also understand the will

of the regulators of the industry and specifically any additional administration required. These may include the use of the product limited to veterinary administration only, the use of the product as a second line treatment only and any additional concerns for public health such as the transfer of antimicrobial resistance.

b) Antimicrobial use should be based on the results of resistance surveillance and monitoring (Bacterial cultures and antimicrobial sensitivity testing): Antibiotics should not be used speculatively to treat non-specific clinical signs. Bacterial culture and antibiotic sensitivity testing helps confirm the need for antimicrobial therapy and identifies the most appropriate drug. Clinicians should strive to use the lowest tier drug that is appropriate. The drug should be given at the correct dose and dosing interval until there is a complete clinical cure. It is critically important that owners understand this to avoid errors in dosing.

A number of alternatives/ replacements have been proposed in lieu of feed antibiotics, including antibacterial vaccines, immunomodulatory agents, bacteriophages and their lysins, antimicrobial peptides (AMPs), pro-, pre-, and synbiotics, plant extracts, inhibitors for bacterial quorum sensing (QS), biofilm and virulence, and feed enzymes, etc to improve the productivity and decrease morbidity and mortality in farm animals.

c) To comply with the ethical obligation and economic need to keep animals in good health: A good veterinary and animal husbandry practice must follow disease prevention practices such as the use of vaccination and improvements in husbandry conditions. Minimum use of antibiotic and growth promoters minimizes the emergence of resistance. Any extended antibiotic applications, such as the use of antibiotics growth promoters (AGPs), which are supplied for continuous, low-dose application, select for increasing resistance to the agent. Their use in large numbers of animals in intensive farming augments the "selection density" of the antibiotic, namely, the number (density) of animals producing resistant bacteria. An ecological imbalance results - one that favors emergence and propagation of large numbers of resistance genes. The selection is not linked merely to the total amount of antibiotic used in a particular environment but to how many individuals are consuming the drug. Each animal feeding on an antibiotic becomes a "factory" for the production and subsequent dispersion of antibiotic-resistant bacteria. Non therapeutic antibiotic uses are also clearly linked to the propagation of multidrug resistance (MDR), including resistance against drugs that were never used in the farm. The chronic use of a single antibiotic selects for resistance to multiple structurally unrelated antibiotics via linkage of genes on plasmids and transposons. All of the above may be members of the normal gut flora of food animals but may have the potential to become serious human pathogens. For example, the finding of bacterial cross-resistance between NTAs used in food animals and human drugs was aptly demonstrated with avoparcin (an AGP) and its close relative vancomycin (an important human therapeutic) when vancomycin-resistant enterococci (VRE) emerged as a serious human pathogen.

d) The contamination of animal-derived food with antimicrobial residues should be prevented not to exceed the established maximum residue limit (MRL). The withdrawal periods should be established to produce safe food in compliance with the MRL for each veterinary medicinal product containing antimicrobial agents.

e) Above all, the responsible use of antibiotics rests with all the relevant professionals and others as described below.

- **Administrative and scientific authorities:** The national regulatory authorities, which are responsible for granting the marketing authorisation, have a significant role in specifying the terms of the authorisation and in providing the appropriate information to the veterinarian through product labelling in support of the prudent use of antimicrobials in veterinary medicine. Competent authorities must take in to account the criteria of safety, quality and efficacy of drug while authorizing. They must assess the risks to both the animal and the consumer resulting from the use of antimicrobial agents in food-producing animals.
- **The veterinary pharmaceutical industry:** It is the responsibility of the pharmaceutical industry to submit the data requested for the granting of the marketing authorisation.
- **Veterinarians, pharmacists and livestock/pet own**er: The role of the veterinarian is not limited to prescribe these medicines and instruct on their administration**.** The treating veterinarians should know all details regarding pharmacodynamics and safety of the drug being prescribed. Pharmacists distributing veterinary antimicrobials should only do so on the prescription of a veterinarian, and all products should be appropriately labelled and stored. Livestock/ pet owner should be educated properly about course of treatment and untoward effects of misuse/ improper treatment schedule. They should address hygienic conditions regarding contacts between people (veterinarians, breeders, owners, and children) and the animals treated. They should comply with proper storage conditions of antimicrobials, recommended withdrawal periods and disposal of surplus antimicrobials under safe conditions.

f) Prevent, or reduce as far as possible, the transfer of bacteria (with their resistance determinants) within animal populations and from animal to human, to maintain the efficacy of antimicrobial agents used in livestock and humans. This can be achieved by strict quarantine measure, good farm practices and by maintaining proper health and hygiene of farm workers.

Conclusion:

The judicious antibiotic use in the present era of antibiotic resistance development needs to be addressed with the cooperation from policy makers, end users and the persons involved in the production, marketing and administrator. Research should be focused for replacement of antibiotics, wherever possible. Innovation in Veterinary pharma-ceuticals is required in order to ensure the future availability of antibiotics to protect animal and human health.

Effect of Different Levels of Vitamin C on Performance of Broiler

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The experiment was to investigate the effect of vitamin C supplementation in ration on the growth and performance of broilers. .A total of 45 DOC of same hatch were procured and randomly distributed into five groups i.e. T_0 (Control), treatments T_1, T_2, T_3 and T_4 with three sub groups comprising of three birds in each to serve as replicates. Broilers in treatment T_0 were fed diet as per NRC standard CP 22 and ME 2900 and broilers in T_1, T_2, T_3 and T_4 were fed standard ration T_0 supplemented with 30 mg of vitamin C, 60 mg of vitamin C, 90mg and 120 mg vitamin C. A bulb of 25 watt was left on in each cage. Broilers were given floor space @ 0.75 sq ft. All broilers were offered water ad lib at all time. They were housed in metal type cages in small animal laboratory. The mean body weight DOC in different treatment T_0, T_1, T_2, T_3, and T_4 was 42.60, 44.60, 42.00, 44.30 and 43.60 g, respectively. The differences in body weight of DOC were non significant. The mean body weight of five weeks of age in T_0, T_1, T_2, T_3, and T_4 was 953.30, 1233.60, 1211.00, 1206.30 and 1289.00 g, respectively. Mean feed intake per broilers in T_0, T_1, T_2, T_3, and T_4 during five weeks of age was 1749.86, 2273.2, 2228.3, 2298.3 and 2412.56 g, respectively and the differences in feed intake of broilers between treatments were significant. Gain in weight broilers at five weeks of of age T_0, T_1, T_2, T_3, and T_4 was 910.63, 1188.96, 1190.92, 1261..95 and 1244.92g, respectively and the differences in feed intake of broilers between treatments was significant. Mean feed conversion ration of broilers in T_0, T_1, T_2, T_3, and T_4 during fifth week of age was 1.95, 1.80, 1.89, 1.94 and 1.79 kg respectively. Differences in FCR of broilers between treatments were non significant. It was concluded that T_4 found the best compared to all the treatments from the economical point of view.

Cloning and Expression of TatD hydrolase of *Clostridium chauvoei*

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Clostridium chauvoei, an anaerobic Gram positive bacilli causes acute, fatal disease in ruminants, Black Quarter, characterized by high fever, emphysematous swelling, commonly affecting heavy muscles. The bacteria produces several toxins namely an oxygen-stable haemolysin (α), DNase (β), hyaluronidase (γ), oxygen labile haemolysin (δ), neuraminidase (sialidase), Clostridium chauvoei toxin A (*CctA*) and surface adhesion protein, flagellin with potential role in pathogenecity of the disease. Although several proteins are secreted by *C. chauvoei*, their role in pathogenesis of the disease or diagnostic potential is lacking. One such cytoplasmic protein, TatD hydrolase, is found to be expressed by various bacterial species, having magnesium dependent deoxyri-bonuclease activity. Hence, the present study was undertaken to clone and express TatD hydrolase of *C. chauveoi*. The TatD hydrolase gene of *C. chauvoei* was amplified by PCR and cloned into Expresso Rhamnose SUMO vector, transformed into *E. cloni* 10G chemically competent cells and expression was induced with L-rhamnose. The purified recombinant protein of TatD hydrolase on SDS-PAGE analysis revealed an expected protein band of about 44 kDa size. Evaluation of DNase activity of the expressed protein is currently under process.

Cloning and Expression of Hyaluronidase gene of *Clostridium chauvoei*

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Black quarter, an important and highly fatal anaerobic infection of ruminants is caused by *Clostridium chauvoei,* a Gram positive, motile, histotoxic, sporulating and obligatory anaerobic bacteria. This bacteria produces various toxins namely an oxygen-stable haemolysin, DNase, hyaluronidase, oxygen labile haemolysin, neuraminidase and CctA. The present study was undertaken to characterize hyaluronidase gene of *C. chauvoei*. The hyaluronidase gene of *C. chauvoei* was amplified by PCR and cloned into expresso rhamnose SUMO vector, transformed into *E. cloni* 10G chemically competent cells and expression was induced with L-rhamnose. The PCR product revealed an amplicon of 1143 bp confirming hyaluronidase gene of *C. chauvoei*. SDS-PAGE analysis of the expressed protein revealed an expected protein band of about 58 kDa size. Further, the expression of recombinant protein was also confirmed by Western blotting. Expressed recombinant hyaluronidase protein was purified and further investigation is needed to evaluate its functional activity.

Antimicrobial resistance pattern and virulence factor characterization of Methicillin Resistant *Staphylococcus aureus* from pyogenic infections in dogs

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The present research was planned to study the incidence, virulence factors and antimicrobial resistance pattern of *Staphylococcus aureus* from skin and soft tissue infections in canines. Swabs from wound and post-operative infection of sixteen dogs presented to Teaching Veterinary Clinical Complex of the institute were collected and subjected to isolation of *S. aureus.* Eight cases revealed the presence of *S. aureus* which were further confirmed by the polymerase chain reaction (PCR) amplification of 280 bp of *nuc* gene. On drug sensitivity against commonly used antibiotics, the isolates revealed six antibiotypes. Out of eight isolates, six were resistant to methicillin and none of the isolate was found resistant to vancomycin. Highest resistance was observed against β-lactam antibiotics, and all the isolates were susceptible to gentamicin and amikacin. By PCR, five out of the eight isolates were positive for the amplification of the 533 bp fragment of *mecA* gene, but none revealed amplification of *vanA* gene. Detection of biofilm formation by congo red agar plate method and PCR amplification of *coa* gene revealed three isolates to be biofilm producers (37.5%) and all the isolates positive for amplification of *coa* gene. Overall, the study reveal high prevalence of MRSA resistant to multiple antibiotics in canine's pyogenic infections indicating for more exhaustive study and regular monitoring of drug resistance pattern for effective treatment and control of MRSA.

Livestock Service Delivery through Mobile Veterinary Units (MVUs) in Odisha: An analysis of Constraints

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In spite of enormous livestock resources, production and productivity of Indian livestock remains low due to several factors including poor livestock service delivery. Towards improving the delivery of livestock services, Mobile Veterinary Unit (MVU) appears an innovative way of animal health service delivery at farmers' doorstep. The MVUs set up with funding under *Rastriya Krishi Vikas Yojana* (RKVY), are currently operational in all the 314 blocks of Odisha. This study was undertaken in Kandhamal district of Odisha during 2016, to analyze the functioning of MVUs including the constraints faced by the farmers as well as the service providers (Veterinary Officers & Livestock Inspectors) in delivering the animal health services through MVUs. The study revealed that limited frequency of service, limited staff in the MVUs, lack of awareness towards importance of service among farmers, less number of awareness camps, short service delivery period and very less remuneration to MVU professionals were the constraints reported by the farmers and service providers. This study, thus, suggests that the MVUs could be more successful in improving the animal health service delivery in rural Odisha, only when these constraints are overcome.

Comparative dye reduction tests for assessing the microbiological quality of chevon during refrigerated storage

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The *microbiological qualities of fresh meatare usually judged by standard plate count procedures. However, due to its time consuming nature rapid methods needs to be developed.* A comparative study was conducted to correlate the colour change in chromogenic dyes of chemical origin with meat quality parameters viz., pH, extract release volume (ERV) and total plate count of chevon during storage at refrigerated temperature (4±1^{o}C). Three dyes namely methylene blue, resazurin and TTC(*2,3,5,-triphenyltetrazolium chloride)* were used in the experiment to indicate the microbiological quality through its colour change in chevon on 0, 3rd, 5th and 7th day of refrigerated storage. *It has been observed that these dyes change their colour through reduction mechanism in definite intervals of time at 37^{o}C.* The resazurin dye showed comparatively promising result with lowest reduction time among three dyes. It changes its colour from initial violet to final pink according to increase in microbial load. The pH of the meat showed increasing trend from 5.93 on 0day to 6.77 on 7th day of storage, whereas the ERV of the meat sample showed decreasing trend from 26.60 ml on 0 day to 22.9 ml on 7th day of storage. The total plate count increased from 4.17 $\log_{10}$cfu/g on 0 day to 6.43 $\log_{10}$*cfu/g of meat on 7th day of storage. With these observations, it can be suggested that time taken to reduce resazurin dye has positive correlation with pH change and total plate count whereas a negative correlation with ERV.*

Medical contraceptives used for animal birth control in dogs

Priya Singh, Bhawana Kushwaha, Pushpendra Singh, Mudasir Ahmad Shah, Rashmi, Deepti Sharma, Mohammed Arif Basha, Swarupanandasahu, Shivaraju S

Contraception used as a reversible method for blocking fertility (and will not include pregnancy termination). There are non-surgical methods to control reproduction. Pharmacologic methods of contraception and sterilization can be safe, reliable and reversible. Hormonal treatments using progestins, androgens, or gonadotrop in releasing hormone (GnRH) analogs act to either directly block reproductive hormone receptor-mediated events, or indirectly block conception via negative feedback mechanisms. Immuno-contraception, via vaccination against GnRH, the luteinizing hormone receptor or zona pellucida proteins, is also possible. Intratesticular or intraepididymal injections provide a method for non-surgical sterilization of the male dog. Additional methods have been employed for mechanical disruption of fertility including intravaginal and intrauterine devices and ultrasound testicular ablation. Surgical methods can be too time consuming and expensive to be performed on a large-scale. Contraceptive and fertility inhibitors could provide a cost-effective, humane alternative to surgical sterilization. In companion animals, fertility inhibitors are used for preventing reproduction, suppressing nuisance behavior such as spraying, roaming, aggressiveness and for treating medical conditions.

Isolation of NTM from human and environmental samples using paraffin baiting technique

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The non-tuberculous mycobacteria (NTM), also known as atypical mycobacteria or mycobacteria other than *M. tuberculosis* (MOTT) have been recognized since Koch's time but being opportunists they did not gain as much importance as *M. tuberculosis*. Today, however, the recovery of NTM from human clinical specimens, where they can cause infections called *"other mycobacteriosis"*, animals and from environmental sources is of concern to microbiologists, epidemiologists, physicians and veterinarians alike. There is a gradual shift in the focus from AFB with rough, tough and buff colonies to AFB with smooth and pigmented colonies, some of which may be rapid growers. NTM infections are more common in developed countries but have also been documented in developing countries of Latin America, Africa, and Asia. A number of species have been found to cause infections in both humans and animals. Some of these species are *M avium paratuberculosis* (MAP), *M. marinum, M. fortuitum, M. chelonae, M. abscessus, M. smegmatis, M. scrofulaceum, M. xenopi, M. kansasii, M. simiae, M. genavense* etc.

Laboratory support is a must to diagnose these conditions and the human samples used for detection of various NTM species are blood, sputum, stool and other extra-pulmonary specimens. Smear examination and isolation of Mycobacteria are two important steps in laboratory diagnosis of such infections. Only smear examination, as recommended by Revised National Tuberculosis Control Programme of India (RNTCP) for diagnosis of tuberculosis, may not be sufficient in such conditions; especially in HIV/AIDS patients, as NTM which are important organisms causing disease in such cases need to be differentiated from *M. tuberculosis* by culture, since the treatment of the two differs. A technique using paraffin coated slides to bait NTM has been used in our laboratory to successfully isolate NTM from clinical and environmental samples. It is based on the principle that NTM can utilise paraffin as a sole source of carbon and energy and was initially used in India for baiting Nocardia from soil samples. This technique however, does not support growth of MAP. Identification of NTM species is important as not only does the treatment varies between the species but geographical location may also be a risk factor for certain species. Speciation is usually done using conventional phenotypic and newer genotypic methods. By conventional methods using morphological and biochemical tests, the identification of mycobacterial strain requires 2 to 4 weeks, in addition to 4-6 weeks required for primary isolation. Newer methods which include analysis of fatty acids by chromatography, hybridization with gene probe, gene amplification followed by restriction analysis, LiPA Mycobacteria(line probe assay) and gene sequencing are very rapid and reduce the turn-around time remarkably. However, all these techniques may not be available in all the laboratories and thus a network of laboratories is needed to share the burden of NTM in the country. In this direction, a step has been taken by establishing Indian National Working Group on NTM and efforts are ongoing to incorporate researchers from human and animal sciences. Since NTM are here to stay we as researchers also need to stay together.

Rapid and visual detection of *Leptospira* in urine by LigB-LAMP assay with pre-addition of dye

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Leptospirosis is considered to be the most widespread zoonotic disease caused by pathogenic species of *Leptospira*. The present study reports a novel set of primers targeting LigB gene for visual detection of pathogenic *Leptospira* in urine samples through Loop-mediated isothermal amplification (LAMP). The results were recorded by using different dyes viz. Hydroxyl napthol blue (HNB), SYBR green I and calcein. Analytical sensitivity of LAMP was as few as 10 leptospiral organisms in spiked urine samples from cattle and dog. LigB gene based LAMP, termed as LigB-LAMP, was found 10 times more sensitive than conventional PCR. The diagnostic specificity of LAMP was 100% when compared to SYBR green real-time PCR for detection of *Leptospira* in urine samples. Though real-time PCR was found more sensitive, the rapidity and simplicity in setting LAMP test followed by visual detection of *Leptospira* infection in clinical samples makes LigB-LAMP an alternative and favourable diagnostic tool in resource poor setting.

Rough *Brucella abortus* S19Δ*rfb*D mutant is highly attenuated and confers moderate protection to mice

Jonathan Lalsiamthara, Gurpreet Kaur, Neha Gogia, Syed Atif Ali, Nongthombam Boby, T.K. Goswami and Pallab Chaudhuri
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Brucella abortus S19 is a smooth strain used as live vaccine against bovine brucellosis. Smooth lipopolysaccharide (LPS) is responsible for its residual virulence and serological interference. Rough mutants defective of LPS are more attenuated but confers lower level of protection. We describe a modified *B. abortus* S19 strain, named as S19*ΔrfbD*, which exhibits rough phenotype. Deletion of rfbD gene of strain S19, which encodes an integral membrane permease for exporting the outer most layer of LPS named O-polysaccharide (O-PS) resulted in high attenuation of S19*Δrfbd.* It mounted immune response in Swiss albino mice and conferred moderate protection as compared to S19 vaccine. Immunized mice produced low levels of IFN-γ, IgG2a. Sera from immunized animals did not show agglutination reaction with RBPT antigen and thus could serve as DIVA (Differentiating Infected from Vaccinated Animals) vaccine. S19*ΔrfbD* mutant displayed more susceptibility to serum complement mediated killing. S19*ΔrfbD* mutant with rough phenotype displayed immunogenicity with improved properties of safety, and DIVA capability for control of bovine brucellosis.

Impact of roof modifications on microclimate for housing crossbred dairy calves

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Eighteen crossbred dairy calves (3-5 months of age) were randomly and equally distributed in to three group's (six in each group) viz. control (normal asbestos roofing), T-1 (painted asbestos roofing) and T-2 (polycarbonate sheet roofing) to compare the effect of roof modification on microclimate of experimental sheds of crossbred calves. The study was conducted during summer months (April to June) for a period of 90 days. The average roof temperature of outer surface in control, T-1 and T-2 groups was 56.54±3.36, 47.82±2.01 and 47.67±1.39°C. The roof temperature of inner surface in control, T-1 and T-2 groups was 39.28±1.29, 35.82±1.28 and 35.72±187°C. The asbestos roofing had significantly higher upper surface temperature than both white painted asbestos (T-1) and polycarbonate roof (T-2). The overall internal temperature of shed in asbestos roofing (27.77±0.02) was significantly ($P<0.05$) higher than painted roofing (25.56±0.19) and polycarbonate roofing (25.86±0.26). The overall relative humidity (%) of shed in asbestos roofing (59.25±0.60) was higher but non-significantly different from painted roofing (57.87±0.37) and polycarbonate roofing (57.33±0.47). The overall temperature-humidity index (THI) of shed in asbestos roofing (76.39±0.67) was significantly ($P<0.05$) higher than painted roofing (73.34±0.66) and polycarbonate roofing (73.56±0.76). The results from the study indicate that roofing modification in both the treatment groups (T1&T2) had lower internal temperature, relative humidity and THI in shed as compared with existing asbestos roofing. The sun reflective roofing materials in animal house may prove worthy for better comfort and welfare of livestock in hot weather conditions.

Identification of tissue of cattle origin by species-specific simplex and real time PCR assays targeting mit. gene sequences

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The present study was carried out with aim to develop and standardize the protocol for species-specific simplex and real time PCR assays for identification of tissue of cattle origin. Species-specific primer pair for cattle was designed through homology comparisons of the mitochondrial D loop gene regions and BLAST analysis of designed primer pairs. The conditions for simplex and SYBR Green real time PCR were optimized in terms of quantity and concentration of various components of PCR mix and annealing temperature. Both the developed assays were evaluated for its species specificity and sensitivity. Applicability of developed simplex PCR assay was also examined on samples from known/coded meat samples, meat admixture and samples subjected to diverse heat treatment viz: boiling, autoclave and microwave. The developed species-specific PCR assay resulted in amplification of DNA template of cattle origin to a PCR product of **305**bp. The real time PCR amplification curve and melt curve analysis using same primer pair also revealed cattle specific amplification. Sensitivity of assays showed that absolute DNA content required for successful identification of tissue of cattle origin was 10ng for simplex PCR and only of 0.0002ng by real time PCR. Standard curve analysis of real time PCR amplification of template DNA from cattle using evolved species specific primer pair set showed slope, correlation coefficient and amplification efficiency of 3.109, 0.977 and 109.72 respectively. The developed simplex PCR assay was found successful in identification of cattle tissue in known/coded samples, meat admixture as well as heat-treated samples. Thus, it was concluded that evolved cattle-specific primer pair is effective in identification of tissue of cattle origin either by simplex or Real time PCR assay.

Rapid and visual detection of *Leptospira* in urine by LigB-LAMP assay with pre-addition of dye

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Brucella abortus S19 is a smooth strain used as live vaccine against bovine brucellosis. Smooth lipopolysaccharide (LPS) is responsible for its residual virulence and serological interference. Rough mutants defective of LPS are more attenuated but confers lower level of protection. We describe a modified *B. abortus* S19 strain, named as S19Δ*rfbD*, which exhibits rough phenotype. Deletion of rfbD gene of strain S19, which encodes an integral membrane permease for exporting the outer most layer of LPS named O-polysaccharide (O-PS) resulted in high attenuation of S19Δ*rfbd.* It mounted immune response in Swiss albino mice and conferred moderate protection as compared to S19 vaccine. Immunized mice produced low levels of IFN-γ, IgG2a. Sera from immunized animals did not show agglutination reaction with RBPT antigen and thus could serve as DIVA (Differentiating Infected from Vaccinated Animals) vaccine. S19Δ*rfbD* mutant displayed more susceptibility to serum complement mediated killing. S19Δ*rfbD* mutant with rough phenotype displayed immunogenicity with improved properties of safety, and DIVA capability for control of bovine brucellosis.

Impact of roof modifications on microclimate for housing crossbred dairy calves

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Eighteen crossbred dairy calves (3-5 months of age) were randomly and equally distributed in to three group's (six in each group) viz. control (normal asbestos roofing), T-1 (painted asbestos roofing) and T-2 (polycarbonate sheet roofing) to compare the effect of roof modification on microclimate of experimental sheds of crossbred calves. The study was conducted during summer months (April to June) for a period of 90 days. The average roof temperature of outer surface in control, T-1 and T-2 groups was 56.54±3.36, 47.82±2.01 and 47.67±1.39°C. The roof temperature of inner surface in control, T-1 and T-2 groups was 39.28±1.29, 35.82±1.28 and 35.72±187°C. The asbestos roofing had significantly higher upper surface temperature than both white painted asbestos (T-1) and polycarbonate roof (T-2). The overall internal temperature of shed in asbestos roofing (27.77±0.02) was significantly ($P<0.05$) higher than painted roofing (25.56±0.19) and polycarbonate roofing (25.86±0.26). The overall relative humidity (%) of shed in asbestos roofing (59.25±0.60) was higher but non-significantly different from painted roofing (57.87±0.37) and polycarbonate roofing (57.33±0.47). The overall temperature-humidity index (THI) of shed in asbestos roofing (76.39±0.67) was significantly ($P<0.05$) higher than painted roofing (73.34±0.66) and polycarbonate roofing (73.56±0.76). The results from the study indicate that roofing modification in both the treatment groups (T1&T2) had lower internal temperature, relative humidity and THI in shed as compared with existing asbestos roofing. The sun reflective roofing materials in animal house may prove worthy for better comfort and welfare of livestock in hot weather conditions.

Identification of tissue of cattle origin by species-specific simplex and real time PCR assays targeting mit. gene sequences

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The present study was carried out with aim to develop and standardize the protocol for species-specific simplex and real time PCR assays for identification of tissue of cattle origin. Species-specific primer pair for cattle was designed through homology comparisons of the mitochondrial D loop gene regions and BLAST analysis of designed primer pairs. The conditions for simplex and SYBR Green real time PCR were optimized in terms of quantity and concentration of various components of PCR mix and annealing temperature. Both the developed assays were evaluated for its species specificity and sensitivity. Applicability of developed simplex PCR assay was also examined on samples from known/coded meat samples, meat admixture and samples subjected to diverse heat treatment viz: boiling, autoclave and microwave. The developed species-specific PCR assay resulted in amplification of DNA template of cattle origin to a PCR product of **305**bp. The real time PCR amplification curve and melt curve analysis using same primer pair also revealed cattle specific amplification. Sensitivity of assays showed that absolute DNA content required for successful identification of tissue of cattle origin was 10ng for simplex PCR and only of 0.0002ng by real time PCR. Standard curve analysis of real time PCR amplification of template DNA from cattle using evolved species specific primer pair set showed slope, correlation coefficient and amplification efficiency of 3.109, 0.977 and 109.72 respectively. The developed simplex PCR assay was found successful in identification of cattle tissue in known/coded samples, meat admixture as well as heat-treated samples. Thus, it was concluded that evolved cattle-specific primer pair is effective in identification of tissue of cattle origin either by simplex or Real time PCR assay.

BROOKE INDIA

An International Charity Working for Welfare of Equines

ABOUT BROOKE

Dorothy Brooke , Founder

The Brooke India (an affiliate of Brooke UK) is an animal welfare charity working to improve the lives of working horses, donkeys, mules and the people who depend on them. Since 2001, Brooke India has been continuously expanding its operational areas directly and through partnership projects. We operate in 10 states of India reaching to 2.97 lakhs equines. Our dedicated field teams help working equines in most challenging conditions at brick kilns, in villages, tonga stands in urban areas and high altitude pilgrims and tourist sites.

OUR MISSION & VISION

Our mission is to transform the lives of vulnerable working horses, donkeys and mules around the world. We relieve their immediate suffering and create lasting change by working with people, communities and organisations

Our vision is of a world in which working horses, donkeys and mules are free from suffering.

SERVICE PROVISION

Through a dedicated team of vets, we provide quality veterinary services to the working equines in the area of greatest needs. Our trained vets work and support local service providers such as LHP, Farrier, Hair Clipper and Government Vets by providing hands on training on equine treatment and linking them with the equine owning community to achieve sustainable welfare.

In the long term we aim to build the capacity of local service providers and various stakeholders to enable them to continue adoption of equine welfare practices by strengthening community participation.

Uttarakhand Disaster Relief Operation

ADVOCACY

Launch of Voices from Women Report

The Brooke India works with policy makers and implementers, as well as other non-governmental organisations to arm them with the evidence, knowledge and technical support they need to improve the welfare of the working horses donkeys and mules through legislation and policy, and though interventions related to livelihoods, gender and live-stock.

We seek to bridge the gaps between human development and working animal welfare by highlighting the linkages and the mutual benefits of improving human and working equine welfare.

Key Achievements:

- Facilitated inclusion of equines in National Livestock Insurance policy
- Facilitated enhancement of Compensation for Glanders
- Facilitated issuance of advisories on Equine fairs and Pilgrim Sites by Animal Welfare Board of India (AWBI).
- Facilitated Incorporation of equine management module in veterinary graduate syllabus through Veterinary Council of India

COMMUNITY ENGAGEMENT

Working with equine owning families, we increase their knowledge on equine diseases and improve their existing equine husbandry practices, in order to make sustainable difference to lives of working horses, donkeys and mules. We mobilise them into equine welfare groups and gradually develop them into self-sustaining Association of EWGs to take up collective actions. We build their capacity through a collective exercises of situation analysis, identification of welfare issues, prioritization of issues and root cause analysis.

Through continuous mobilization and motivation of the community we ensure proper implementation of the programme by regular monitoring using various participatory techniques like Participatory Welfare Need Assessment (PWNA)., to ensure a sustainable equine welfare project.

Participatory Welfare Need Assessment

EQUINE FAIRS

Makhanpur Equine Fair

Equine fairs is one of most important areas of our intervention which provides us opportunity to educate equine owners, service providers to minimize pain and suffering during treatment and transfer know how on equine welfare issues to a large gathering. We also, encourage fair organisers for provisioning of basic facilities like proper watering, shade and ramp for loading and unloading animals as per the Animal Welfare Board of India (AWBI) guidelines.

WORK TYPES

Transport of Bricks: Horses, mules and donkeys transport unbaked bricks in harsh working environment, either by pack or cart. These working equines support the livelihoods of thousands of equine owners and offer six months seasonal employment.

Equine at Brick Kiln

Transport of Sand

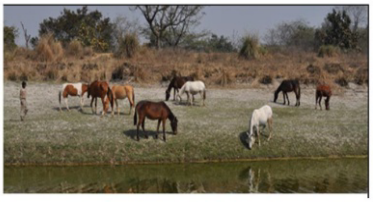
Transport of Pilgrims/Tourists: Horses, mules & ponies work in hilly terrains transporting pilgrims and tourists. These working equines are vital for local economy as they provide livelihoods to the people in remote locations. The mountain shrines offer seasonal employment to equine owners except Katra, Jammu, where work continues throughout the year.

Transport of people and goods: Horses, mules and donkeys driven carts/togas are used for transporting people, goods, construction material and various other commodities in rural and semi-urban areas.

***Donkeys* in Maharashtra:** Working donkeys provide livelihoods to thousands of marginalized communities in Maharashtra. These animals transport agricultural produce, bricks, construction materials, washer men clothes, and sand from the riverbeds.

QALANDAR COMMUNITY

Qalandar is one of the poorest community of northern India. This nomadic community is associated with breeding of equines for foal rearing (mostly mules). They usually camp along the banks of River Yamuna and Ganges. Approximately 90% of their income comes from selling the foal and renting donkey stallion for breeding purpose. In addition the also engage in public recreation(magic shows) and work as daily labourers.



Qalandar's Equines

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