UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES LAHORE

Dept. of Pathobiology
College of Veterinary and Animal Sciences
Jhang

Virtual One Health International Conference

25-26 November
2020

ONE HEALTH

Editor-in-Chief
Prof. Dr. Muhammad Fiaz Qamar

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Dr. Muhammad Adnan Saeed
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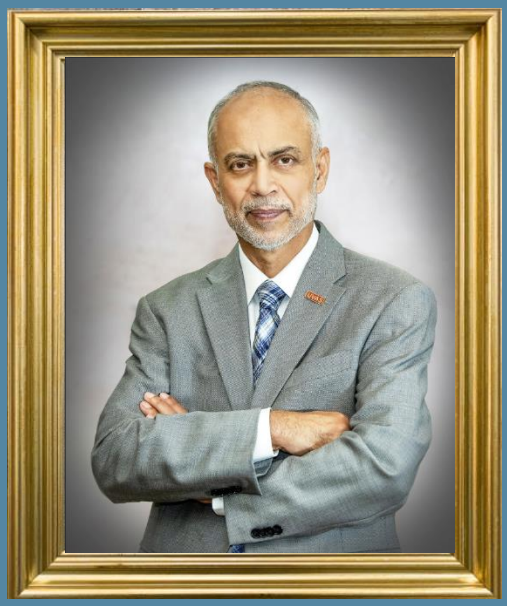
Pro-Chancellor's Message, Livestock & Dairy Development, Punjab, Lahore

Virtual International One-Health Conference (VIOHC-2020), organized by the College of Veterinary and Animal Sciences, Jhang, Pakistan aims to bring together leading academic scientists, researchers, scholars, and students to exchange and share their experiences and research results on various aspects of One-Health. I hope it will provide a leading interdisciplinary platform for researchers, experts, and educators to present and discuss the most current innovations, trends, concerns, and policy as well as practical challenges met and solutions implemented in the fields of One-Health. In Government, we have been monitoring the COVID-19 outbreak closely and have tried to keep you informed of the rapidly changing situation as it relates to our province and the country. As part of this process, we have been in close contact with public health officials and have been monitoring guidance from the professionals regarding disease control and prevention. Our vision is 'A World unified against infectious diseases'. Infectious disease remains one of the world's greatest threats to human and animal life, the environment, local communities, and economies. We want to enable you to use your local knowledge and relationships to prompt disease detection and early response. I wish that VIOHC 2020 will connect scientists, epidemiologists, veterinarians, medical doctors, nurses, paramedics, community health workers, students, and I.T. specialists to find solutions to global disease surveillance and will offer a platform to test and scale up innovations in human and animal health.

Thanks

Sardar Husnain Bahadar Dreshak
Pro-Chancellor, UVAS, Lahore
Minister, Livestock & Dairy Development, Punjab, Lahore

Vice-Chancellor's Message



It's a great pleasure for us to welcome you to the virtual International One-Health Conference 2020 (VIOHC 2020) organized by the College of Veterinary and Animal Sciences, Jhang, Pakistan. This conference is planned to integrate expertise drawn from a variety of disciplines in the One-Health community, including medicine, veterinary medicine, public health, agricultural and environmental sciences to improve the health of people, animals, and the planet. VIOHC-2020 aims to provide an international venue for One-Health researchers to present their research findings of One-Health accomplishments. There has been a significant rise in the emergence of infectious agents and the likely risk of new pandemics, as exemplified by the emergence and spread of SARS-CoV-2 and COVID-19. Therefore, a clear need for countries to have the competence and capacity to maintain an effective alert and response system to detect and rapidly react to outbreaks of international concern. Responding to pandemic threats requires global collaboration and participation. From this viewpoint, we would like to invite you to VIOHC 2020. Hopefully, you will enjoy our scientific program. The synergism achieved will advance health care for the 21st century. If a proper policy is implemented, it will help protect and save untold millions of lives of our present and future generations.

Prof. Dr. Nasim Ahmad (*S.I*)
Vice-Chancellor, UVAS, Lahore

Pro Vice-Chancellor's Message, UVAS, Lahore

"One-Health" concept summarized an idea that had been known for more than a century; that human health and animal health are interdependent and bound to the health of the ecosystems in which they exist. This concept is envisioned and implemented by the OIE as a collaborative global approach to understanding risks for human and animal health (including both domestic animals and wildlife) and ecosystem health as a whole. The OIE builds upon the intergovernmental standards which it publishes and the worldwide information on animal health that it collects as well as its network of international experts and programs for strengthening national veterinary services. Coming from the "One Medicine" concept that supports a combination of human medicine and veterinary medicine in response to zoonoses. The novel "One-Health" initiative constitutes a global strategy highlighting the need for an approach that is holistic and transdisciplinary and incorporates multisector expertise in dealing with the health of mankind, animals, and ecosystems. This knowledge is required for the development of novel control strategies inspired by environmental mechanisms leading to desired equilibrium and dynamics in healthy ecosystems. The virtual international One-Health conference (VIOHC 2020) at CVAS, Jhang is expected to provide soon building a framework for more integrated operational initiatives in the country.

Prof. Dr. Masood Rabbani (*Izaz-i-Fazeelat*)

Pro Vice-Chancellor, UVAS, Lahore

The Principal's Message

I am delighted to invite you to the Virtual International One-Health Conference 2020 (VIOHC 2020) organized by the College of Veterinary and Animal Sciences (CVAS), Jhang, Pakistan. One Health' or 'One Medicine' suggests the unification of the medical and veterinary professions with the establishment of collaborative ventures in clinical care, surveillance, and control of cross-species disease, education, and research into disease pathogenesis, diagnosis, therapy, and vaccination. The concept covers the human population, domestic animals, and wildlife, and the impact that environmental changes ('environmental health') such as global warming will have on the inhabitants. We warmly welcome the growing movement of One-Health researcher who strongly supports the idea of a cohesive approach to the human, animal, and environmental health as the best solution to the urgent health threats. I hope the conference will build upon the excellent sessions and discussions.

Prof. Dr. Abdul Shakoor

The Principal, CVAS, Jhang

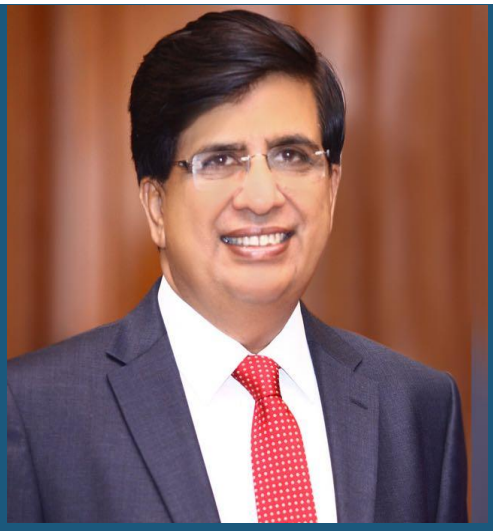
Chief Organizer's Message

Health issues at the human-animal-environment interface cannot be effectively addressed by one sector alone. Collaboration across all sectors and disciplines responsible for health is required to address zoonotic diseases and other shared health threats at the human-animal-environment interface. One Health is a collaborative, multidisciplinary, and multisectoral approach that can address urgent, ongoing, or potential health threats at the human-animal-environment interface at subnational, national, regional, and global levels. The Sustainable Development Goals (SDGs), entitled "Transforming our world: the 2030 Agenda for Sustainable Development", object to eliminate poverty and achieve sustainable development. Taking a multisectoral, One Health approach for zoonotic diseases that addresses the interconnectedness of health and its social and economic determinants aligns with the SDG framework. Health is a critical consideration in achieving the 17 goals, and taking a One Health approach in health sector will support making progress in achieving the SDGs. I hope the Virtual International One-Health Conference 2020 (VIOHC 2020) organized by the College of Veterinary and Animal Sciences (CVAS), Jhang, Pakistan will benefit countries by developing their zoonotic disease strategies and encourages a One Health approach to food safety emergency response.

Prof. Dr. Muhammad Fiaz Qamar
Chief organizer, VIOHC 2020

SESSION CHAIR

Prof. Dr. Muhammad Sajjad Khan
Vice Chancellor
Cholistan university of Veterinary and Animal sciences Bahawalpur

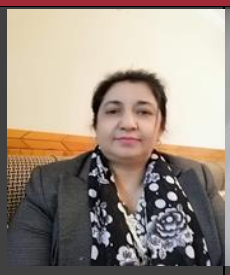
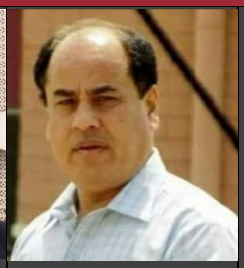
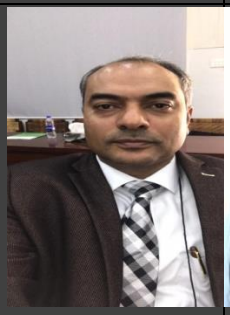


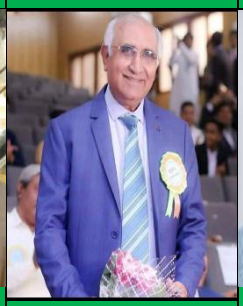
Prof. Dr. Talat Naseer Pasha
Vice Chancellor
University of Education, Lahore

Prof. Dr. Muhammad Zakria Zakar
Vice Chancellor
University of Okara

Prof. Dr Khalid Masud Gondal,
Vice Chancellor
King Edward Medical University, Lahore

SESSION CO-CHAIR

					
Prof. Dr. Farkhanda Manzoor Dugal Chairperson Department of Zoology, LCWU, Lahore	**Prof. Dr. Khalid M. Al-ghamdi, Vice Dean, King Abdul Aziz University, Jeddah, Saudi Arabia**	**Prof. Dr. Tahir Yaqub Director Institute of Microbiology UVAS Lahore**	**Prof. Dr. M Subhan Qureshi, President at Dairy Science Park**	**Prof. Dr. Masood Akhtar, Dean FVS, BZU, Multan**	**Prof. Dr. Zafar Iqbal Qureshi, Dean, FVS, UAF**
					
Prof. Dr Asim Khalid Mahmood UVAS Lahore	**Prof. Dr. Muhammad Khalid Mansoor The Islamia University (IUB) of Bahawalpur**	**Prof. Dr. RPVJ Rajapakse HOD, Pathobiology, University of Peradeniya, Sri Lanka**	**Prof. Dr. Faiza Bashir, Dean Services Institute of Medical Sciences, Lahore**	**Prof. Dr. Kamran Ashraf, Chairman Deptt. Of Parasitology, UVAS, Lahore**	**Prof. Dr. Sajjad ur Rehman, Director, IOM, UAF**

					
Prof. Dr. Nusrat Jahan, Prof. Emeritus, GCU, Lahore	**Prof. Dr. Zafar Hayat, College of Veterinary and Animal Sciences, Jhang**	**Prof. Dr. Amir Ghafoor Bajwa, UDL, UVAS, Lahore**	**Dr. Hassan Mushtaq. Epidemiology & Public Health, UVAS, Lahore**	**Prof. Dr. Iahtasham Khan, College of Veterinary and Animal Sciences, Jhang**	**Professor. Dr. Ahrar Khan, Shandong Vocational Animal Science and Veterinary College, Weifang China**
					
Dr. Farhan Ahmad Atif, College of Veterinary and Animal Sciences, Jhang	**Dr Muhammad Azam Kakar Director at World Bank Pakistan**	**Dr. Abid Hussain Shehzad, College of Veterinary and Animal Sciences, Jhang**	**Dr. Abdullah Arijo Sindh Agriculture University, Tandojam**	**Dr. Muhammad Zubair Shabbir University of Veterinary and Animal Sciences, Lahore, Pakistan**	**Dr. Naveeda Qureshi Associate Professor, QAU, ISD**

ORGANIZING DEPARTMENT

Prof. Dr. Muhammad Fiaz Qamar

Dr. Usman WAHEED

Dr. Muhammad Arfan Zaman

Dr. Syed Ehtisham-ul-Haque

Dr. ishtiaq Ahmed

Dr. M. Kamran Rafique

Dr. Aman Ullah Khan

Dr. Aziz-ur-Rehman

Dr. Kazim Ali

Dr. Muhammad Sajid

Dr. M. Adnan Saeed

Topic: Virtual One Health International Conference

Time: Nov 25-26, November, 2020 09:30 AM Islamabad, Karachi, Tashkent

Please download and import the following iCalendar (.ics) files to your calendar system.
Daily: https://us02web.zoom.us/meeting/tZYvdOitqjMtE9JCGbcLiG-anprHyj2tOkcO/ics?icsToken=98tyKuGqrDgrH9CdtxCBRpwQAIjCd-_wiFxaj_p3vzjnAAxaRU73OPJQGqt1Qsz_

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+1 301 715 8592 US (Washington D.C)
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Passcode: 112039
Find your local number: https://us02web.zoom.us/u/kx86tpDBh

Committees for the 2nd International Virtual One Health Conference

Organizing Committee

1	Prof. Dr. Nasim Ahmad, SI, Vice Chancellor, UVAS, Lahore	Patron in chief
2	Prof. Dr. Masood Rabbani Pro Vice Chancellor / Dean. FVS, UV`AS, Lahore	Patron
3	Prof. Dr. Abdul Shakoor Principal, CVAS, Jhang	Chief Coordinator
4	Prof. Dr. Muhamad Fiaz Qamar Chairman, Department of Pathobiology CVAS, Jhang	Chief Organizer
5	Prof. Dr. Kamran Ashraf Chairman Deptt. Of Parasitology, UVAS, Lahore	Member
6	Professor Dr. Tahir Yaqoob Director, IOM, UVAS, Lahore	Member
7	Prof. Dr. Zafar Hayat Chairman Deptt. Of Animal Sciences, CVAS, Jhang	Member
8	Prof. Dr. Iahtasham Khan Chairman Deptt.of Clinical Sciences, CVAS, Jhang	Member
9	Prof. Dr. Amir Ghafoor Bajwa UDL, UVAS, Lahore	Member
10	Dr. Hassan Mushtaq Associate Professor, Epidemiology & Public Health, UVAS, Lahore	Member
11	Dr. Muhammad Arfan Zaman Associate Professor, Pathobiology, CVAS, Jhang	Member
12	Dr. Syed Ehtesham-ul-Haque Associate Professor, Pathobiology, CVAS, Jhang	Member
13	Dr. Aziz-ur-Rehman Assistant Professor, Pathobiology, CVAS, Jhang	Member
14	Dr. Usman Waheed Associate Professor, Pathobiology, CVAS, Jhang	Organizing Secretary

TORs:

The Committee will be responsible for planning, arrangement and organization of the international virtual one health conference

Registration Committee

1	Dr. Aziz ur Rehman, Assistant Professor, Department of Pathobiology CVAS, Jhang	Convener
2	Dr. Tariq Hussain	Member
3	Dr. Warda Qamar, Research Assistant	Member
4	Dr. Uzma Mehreen, Research Assistant	Secretary/ Member

TORs: The committee will be responsible for the registration of the participants and keeping record of the registration

Finance Committee

1	Dr. Muhammad Arfan Zaman Associate Professor, Pathobiology, CVAS, Jhang	Convener
2	Miss Saima Liaqat Lecturer, Social Sciences, UOJ	Member
3	Dr. Zohaib Shahid, Research Assistant	Member
4	Dr. Adnan Saeed Lecturer, Department of Pathobiology CVAS, Jhang	Secretary / Member

TORs:

The committee will manage the budget and maintain the record of the budget

IT Committee

1	Mr. Rizwan Saleem Director, IT, UVAS, Lahore	Convener
2	Mr. Ali Raza IT Lab Assistant	Member
3	Mr. Abdul Ayaz Khan Lecturer, Computer Sciences	Secretary / Member

TOR'S:

The committee will make all the necessary arrangements for the smooth conduct of the sessions by ensuring internet availability

Scientific Committee

1	Dr. Rao Zahid Abbas Associate Professor, FVS, UAF	Convener
2	Dr. Hassan Mushtaq, Associate Professor, Epidemiology & Public Health, UVAS, Lahore	Member
3	Dr. Usman Waheed Associate Professor, Pathobiology, CVAS, Jhang	Member
4	Dr. Asif Zahoor Associate Professor, GCU, Faisalabad	Member
5	Dr. Ali Zohaib Assistant Professor, NUST, ISD	Member
6	Dr. Zubair Shabbir Assistant Professor, IOM, UVAS, Lahore	Member
7	Dr. Syed Ehtisham-ul-Haque Associate Professor, Pathobiology, CVAS, Jhang	Member
8	Dr. Muhammad Arfan Zaman Associate Professor, Pathobiology, CVAS, Jhang	Member
9	Dr. Ishtiaq Ahmed, Lecturer, Pathobiology, CVAS, Jhang	Member
10	Muhammad Farooq, Assistant Professor, Epidemiology, CVAS, Jhang	Secretary/ Member

TOR's:

1. The committee will receive and scrutinize all the abstracts and papers received

Media/ Communication Committee

1	Dr. Muhammad Sajid, Assistant Professor, Pathobiology CVAS, Jhang	Convener
2	Samina Suppra	Member

	Lecturer, UOJ	
3	Umer Farooq MPhil Student	Member
4	Dr. Kazim Ali Lecturer, Pathobiology, CVAS, Jhang	Secretary/ Member

Oral Presentation Committee

1	Dr. Usman Waheed Associate Professor, Pathobiology, CVAS, Jhang	Convener
2	Dr. Naveeda Qureshi Associate Professor, QAU, ISD	Member
3	Dr. Adnan Saeed Lecturer Microbiology, CVAS, Jhang	Member
4	Dr. Ali Zohaib Assistant Professor, NUST, ISD	Member
5	Dr. Zubair Shabbir Assistant Professor, IOM, UVAS, Lahore	Member
6	Dr. Syed Ehtisham-ul-Haque Associate Professor, Pathobiology, CVAS, Jhang	Secretary / Member

TOR's: The committee will receive and scrutinize all the abstracts and papers received

Poster Presentation Committee

1	Dr. Tariq Hussain Assistant Professor, Pharmacology, CVAS, Jhang	Convener
2	Dr. Arbab Sikander Lecturer, Histology, CVAS, Jhang	Member
3	Mr. Jamil MPhil Student	Member
4	Mr. Abid Zeeshan MPhil Student	Member
5	Dr. Ishtiaq Ahmed, Lecturer, Pathobiology, CVAS, Jhang	Secretary / Member

TOR's:

Committee will screen e-posters for presentation as per theme.

Videography Presentation Committee

1	Dr. Muhammad Kamran Rafique Lecturer, Pathology, CVAS, Jhang	Convener
2	Mr. Tahir Miraj Chisti MPhil Student	Member
3	Aftab Hussain DVM Final Year Student	Member
4	Mr. Abdul Ayaz Khan Lecturer, IT, CVAS, Jhang	Secretary / Member

TORs: Committee will be responsible for evaluating the quality content of scientific videos as per the theme

Inaugural Session Program

25th November, 2020 (Wednesday) 9:25 -10:00am (PST= GMT+5)		
When	**What**	**Who**
09:25 – 09:30 am	All Guests Login	https://us02web.zoom.us/j/82231548796?pwd=TGNEbHc2Q3dSK3ZIUDJpemNDOUl5dz09
09:30 – 09:33 am	Recitation from Holy Quran	Dr. Aziz-ur-Rehman, Assistant Professor, CVAS, Jhang
09:34 – 09:36 am	Naat, Rasool-e-Maqbool (S.A.W)	Dr. Muhammad Sajid, Assistant Professor, CVAS, Jhang
09:37 – 09:42 am	Overview to the Conference	Prof. Dr. Muhammad Fiaz Qamar, Chairman Pathobiology/ Organizing Secretary
09:43 – 09:45 am	Comments by the Principal, CVAS, Jhang	Prof. Dr. Abdul Shakoor, Principal, College of Veterinary & Animal Sciences, Jhang
09:46 – 09:50 am	Comments by the Pro Vice-Chancellor, UVAS, Lahore	Prof. Dr. Masood Rabbani Pro Vice-Chancellor University of Veterinary & Animal Sciences, Lahore, Pakistan
09:50– 09:55 am	Welcome, Address by Vice-Chancellor, UVAS, Lahore	Prof. Dr. Nasim Ahmad, *S.I.* Vice-Chancellor University of Veterinary & Animal Sciences, Lahore, Pakistan.
09:55 – 10:00 am	Inaugural Address by Pro-Chancellor, UVAS, Lahore. (Chief Guest)	Sardar Husnain Bahadar Dreshak, Minister for Livestock & Dairy Development Punjab

Oral Presentations Program

25th November 2020 (Wednesday) 10:00 – 12:00 pm PST (GMT+5)

Session Chair: Prof. Dr. Talat Naseer Pasha, Vice-Chancellor University of Education, Lahore
Email: vc@ue.edu.pk

Co-Chair

1. **Prof. Dr. Saira Afzal, Chairperson, and Head of Community Medicine Department, King Edward Medical University, Lahore**
2. **Prof. Dr. Khalid Mansoor, Dean, FV&AS, IUB**
3. **Prof. Dr. Amir Ghafoor Bajwa UDL, UVAS, Lahore**
4. **Dr. Farhan Ahmad Atif, Medicine Section, Department of Clinical Sciences, College of Veterinary and Animal Sciences, Jhang**

Moderator:

Dr. Muhammad Arfan Zaman, Department of Pathobiology, College of Veterinary & Animal Sciences, Jhang, Pakistan

Oral Presentation Session 01 Evaluation Committee

1. **Prof. Dr. Zafar Ali Choudry, VC, Faisalabad Medical University**
2. **Prof. Dr. Masood Akhtar, Dean FVS, BZU, Multan**
3. **Dr. Zarfishan Tahir, Dean, IPH, Lahore**
4. **Dr. Aman Ullah Khan, Lecturer, Pathobiology, CVAS, Jhang**

Session No. 1 (Antimicrobial Resistance and Environment)

10:00-10:08	**Ali Sharif** Faculty of Pharmacy, The University of Lahore, Institute of Pharmacy	Antimicrobial Resistance Patterns in Bacterial Isolates for Designing Empirical Therapy from a Tertiary Health Care Unit of Lahore
10:08-10:16	**Dr. Muhammad Asif Zahoor** *Department of Microbiology, Government College University, Faisalabad-Pakistan*	Phytochemical analysis and *in vitro* activity of *Azadirachta indica* extract against methicillin resistant *Staphylococcus aureus* and methicillin resistant *Staphylococcus epidermidis*
10:16-10:24	**Dr. Mashkoor Mohsin** Institute of Microbiology, University of Agriculture, Faisalabad, Pakistan	Evidence of Antimicrobial Use and Antimicrobial Resistance in the Food Animals: Lesson Learned in Pakistan
10:24-10:32	**Abu Baker Siddique** Department of Microbiology, Faculty of Life Sciences, Government College University Faisalabad-Pakistan	Occurrence of AmpC beta-lactamase in *Pseudomonas aeruginosa* isolated from urinary tract infections
10:32-10:40	**Rumesa Asrar** Department of Microbiology, Government College University, Faisalabad,	Molecular Characterization of ESBLs genes among Multidrug-resistant Gram-negative bacteria from Operation theatres and ICUs of different hospitals
10:40-10:48	**Hafiz Iftikhar Hussain** *College of Veterinary Medicine, Huazhong Agricultural University, Wuhan-430070, China*	Zoonotic Threat of Antibiotic-Resistant and Virulent Avian Pathogenic *Escherichia coli*
10:48-10:56	**Fareeha Fiayyaz** Department of Microbiology,	Evaluation of antibacterial effects of *Azadirachta indica* (Neem) extracts

	Government College University Faisalabad.	against MDR *Acinetobacter baumannii*
10:56-11:04	**Dr. Syed Ehtisham-ul-Haque,** Assoc. Prof**.** Department of Pathobiology, University of Veterinary and Animal Sciences, Lahore, (Jhang Campus), Jhang, Pakistan.	Prevalence and antimicrobial resistance of *Campylobacter jejuni* in poultry in District, Jhang, Pakistan
11:04-11:11	**Tyyba Arshad** Department of Pathobiology, College of veterinary and animal sciences, Jhang University of veterinary and animal sciences, Lahore, Pakistan	Antimicrobial resistant *Campylobacter:* An emerging foodborne zoonosis
11:11-11:18	**Wafa Yousaf** Department of Pathobiology, University of Veterinary and Animal Sciences, Lahore, Pakistan (sub campus Jhnag)	Current perspectives of antimicrobial Susceptibility patterns of Campylobacter Species
11:18-11:25	**Nemra Mahtab,** Department of Pathobiology, University of Veterinary and Animal Sciences, Lahore, Pakistan (Jhang Campus)	Fluoroquinolone-Resistant Campylobacter Species of Poultry, An Evolving Public Health Challenge
11:25-11:32	**Tayyab Mushtaq** Department of Microbiology, Government College University, Faisalabad, Pakistan.	Occurrence and characterization of ESBLs in Gram-negative Multidrug resistant bacteria from health-care settings
11:32-11:39	**Mehwish Younas** Department of Microbiology, Government College university, Faisalabad.	Green Synthesis of Silver Nanoparticles from Moringa Oleifera And Their Antibacterial Activity Against Different Pathogenic Microbes.
11:39-11:46	**Dr. Bilal Aslam** Department of Microbiology, Government College University Faisalabad, Faisalabad, Pakistan	Emergence of blaNDM-1 Harboring *Klebsiella pneumoniae* ST29 and ST11 in Veterinary Settings and Waste of Pakistan
11.46-11:53	**Adeel Sattar** Department of Pharmacology and Toxicology, University of Veterinary & Animal Sciences, Lahore	Antibacterial activity of ofloxacin in combination with ketoprofen against *Staphylcoccus aureus* and *Pseudomonas aeruginosa* isolated from clinically infected patients.
11:53-12:00	**Zulqarnain Baloch** Faculty of Life Science and Technology, Kunming University of Science and Technology, 650500 Yunnan China, P.R. China	Antibacterial resistance of *Staphylococcus aureus* isolated from retail food products in China
Session No. 2 (Zoonotic diseases and One-health) 02:00 – 04:00 pm PST (GMT+5) Session Chair: Prof. Dr. Muhammad Zakria		

Zakar, Vice Chancellor, University of Okara, Email: mzzakir@yahoo.com

Co-Chair

1. **Prof. Dr. Faiza Bashir, SIMS,Lahore**
2. **Prof. Dr. Zafar Iqbal Qureshi, Dean, FVS, UAF**
3. **Dr. Hassan Mushtaq. Associate Professor, Chairman Epidemiology & Public Health, UVAS, Lahore**
4. **Prof. Dr. Iahtasham Khan, Chairman Department of Clinical Sciences, College of Veterinary and Animal Sciences, Jhang**

Moderator:

Dr. Syed Ehtisham-ul-Haque, Associate Professor, Department of Pathobiology, College of Veterinary & Animal Sciences, Jhang, Pakistan

Oral Presentation Session 02 Evaluation Committee

1. **Prof. Dr. Bushra Mirza, VC, LCWU**
2. **Prof. Dr. Khalid Al-ghamdi, King Abdul Aziz University, Jeddah, KSA**
3. **Madam Bushra, Director Education, DG Nursing, Lahore**
4. **Dr. Muhammad Farooq, Assistant Professor, Department of Clinical Sciences, CVAS, Jhang**

02:00-02:08	**Dr. Milka D. Madhale.** Associate Professor, College of health sciences, Department of Nursing, Arsi University, Asella, Ethiopia.	*A study to develop foot pressure scanner in early identification of pressure points in diabetics*
02:08-02:16	**Olivier Sparagano** Department of Infectious Diseases and Public Health, Jockey Club College for Veterinary Medicine and Life Sciences, City University of Hong Kong, Hong Kong SAR, China	Veterinarians and One Health: Tackling the control of the Poultry Red Mite (PRM), *Dermanyssus gallinae*
02:16-02:24	**Tahir Ali Chohan** Institute of Pharmaceutical Sciences, University of Veterinary and Animal Sciences, Lahore, 54000, Pakistan	Cyclin dependent kinases 2 inhibitors as anticancer agents; an *in-silico* prospective
02:24-02:32	**Muhammad Adnan Sabir Mughal** Department of Parasitology, University of Agriculture, Faisalabad-38040, Pakistan	Environmental Parasitology: Bioindicator for Aquatic Ecosystems
02:32-02:40	**Sumaira Malik** Department of Pathobiology, University of Veterinary & Animal Sciences, Lahore sub-campus Jhang	The Control Options of Brucellosis in Ovine and Caprine Population In Pakistan
02:40-02:48	**Rizwan Saeed** Institute of Microbiology, University of Agriculture Faisalabad, Pakistan	A cross-sectional survey of brucellosis in small ruminants of district Jhang, Punjab, Pakistan
02:48-02:56	**Muhammad Farhab** College of Veterinary Medicine, Yangzhou University, Yangzhou, Jiangsu (225009), China	An overview of common diseases of camels in Pakistan
02:56-03:04	**Bushra Akhtar**	Peel extract of *Citrus paradisi* based

	Department of Pharmacy, University of Agriculture, Faisalabad	nanoparticles as therapeutic alternatives for wound infections
03:04-03:12	**Muhammad Khurram Waqas** Institute of Pharmaceutical Sciences, University of Veterinary and animal Sciences, Lahore, Pakistan	Development and Characterization of Oral Drug Delivery System Containing Antifungal Agent for the Treatment of Oral Thrush
03:12-03:20	**Muhammad Irfan Siddique** Institute of Pharmaceutical Sciences, University of Veterinary and Animal Sciences, Lahore, Pakistan.	Development and Physicochemical characterization of Orodispersible Film Containing insoluble Cefixime Trihydrat
03:20-03:28	**Ayesha Zaka** Genomics Research Lab, Department of Biological Sciences, International Islamic University, Islamabad, Pakistan	A Novel Homozygous Frameshift Mutation in The *Dcc* Gene In a Pakistani Family with Autosomal Recessive Horizontal Gaze Palsy with Progressive Scoliosis-2.
03:28-03:36	**Mian Muhammad Awais** Department of Pathobiology, Faculty of Veterinary Sciences, Bahauddin Zakariya University Multan, Pakistan	Prevalence of *Cryptosporidium parvum* in cattle population of nomadic communities in and around Multan, Pakistan
03:36-03:44	**Mubashar Hussain** *University of Gujrat, Gujrat, Department of Zoology*	Prevalence, Isolation and Characterization of *Anaplasma marginale* in Cattle from District Gujranwala, Pakistan
03:44-03:52	**Muhammad Usman Qamar** Department of Microbiology, Faculty of Life Sciences, Government College University Faisalabad, Pakistan	Co-existence of *bla*$_{NDM}$ and *mcr-1* producing *Escherichia coli* isolated from human, poultry and environment water from Pakistan – A One Health concern
03:52-04:00	**Saima Arif** Save Pakistan from Rabies (SPR), College of Veterinary and Animal Sciences, Postal Code 35200, Jhang	Prevalence of Rabies Cases in Livestock & Eliminating Rabies by Public-Veterinarian Partnership
04:00-04:08	**Dr. Zahid Majeed Asst. Professor,** Department of Biotechnology, Chehla Campus, University of Azad Jammu and Kashmir, Muzaffarabad.	Inhibitory analysis of rosin against multidrug resistant Staphlyococcus epidermidis

26th November, 2020 (Thursday) 10:00 – 12:00 pm PST (GMT+5)

Session Chair: Prof. Dr. Muhammad Sajjad khan, Vice Chancellor, Cholistan University of Veterinary and Animal Sciences, Bahawalpur

Co-Chair

1. **Dr. Ahrar Khan, DVM, Ph.D (UAF), Professor. Shandong Vocational Animal Science and Veterinary College, Weifang China**
2. **Prof. Dr. Sajjad ur Rehman, Director, IOM, UAF**
3. **Professor Dr. Tahir Yaqoob, Director,**

IOM, UVAS, Lahore

4. **Prof. Dr. Zafar Hayat, Chairman, Department of Animal Sciences, College of Veterinary and Animal Sciences, Jhang**

Moderator:

Dr. Ishtiaq Ahmad, Department of Pathobiology, College of Veterinary & Animal Sciences, Jhang, Pakistan

Oral Presentation Session 03 Evaluation Committee

1. **Prof. Dr. Aamir Zaman Khan, VC, Fatima Jinnah Medical University, Lahore**
2. **Prof. Dr. Dwight Bowman, Cornell University, USA**
3. **Prof. Dr. RPVJ Rajapakse HOD, Veterinary Pathobiology, University of Peradeniya, Sri Lanka**
4. **Dr. Muhammad Kamran Rafique, Lecturer, Department of Pathobiology, CVAS, Jhang**

Session no. 3 (Role of Veterinarians in One Health)
Tick Borne diseases (TBD) of zoonotic importance, Global Eradication program of Rabies, Role of Veterinarians during Covid-19 pandemic, food of animal origin and Food safety

10:00-10:08	**Kasturi Viswanathsetty Veerabhadrappa** Department of Pharmacy, College of Health sciences, Asri University, Asella, Ethiopia	Synergistic antiulcer activity of methanolic extract of a mixture of Cinnamon cassia Bark and Annona squamosa twigs in indomethacin-induced ulcer
10:08-10:16	**Saima Naz** Department of Veterinary Sciences, Faculty of Agrobiology, Food, and Natural Resources, Czech University of Life Sciences, Prague-16500. Czech Republic	Quantitative parasitological parameters to analyze the helminthic infection in Francolins (Galliformes: Phasianidae) with a new species of acanthocephalan from Pakistan.
10:16-10:24	**Dr. Umara Rauf** Department of Psychology. Government College Women University, Sialkot	Social Support as a Predictor of Quality of Life and Mental Health among Females with and without Menstruation Problems: A Comparative Study
10:24-10:32	**Asia Parveen** Institute of Pure and Applied Biology, Zoology Division. Bahauddin Zakariya University, Multan, Pakistan	Molecular epidemiology of *Theileria annulate* infection of cattle in Layyah District, Pakistan
10:32-12:40	**Shehla Gul Bokhari** Pet Centre, University of Veterinary & Animal Sciences, Abdul Qadir Jilani Road, Lahore, Pakistan	Comparative Efficacy of Ivermectin, Doramectin, and Moxidectin Against Sarcoptic *Mange* in Rabbits
10:40-10:48	**Hafiz Muhammad Rizwan** Section of Parasitology, Department of Pathobiology, College of Veterinary and Animal Sciences, Narowal, Sub campus UVAS, Lahore.	Epidemiology and Control of Congo Fever in Sacrificial Animals of Pakistan
10:48-10:56	**Shabab Nasir** Department of Zoology, Government College University, Faisalabad	Detection and Prevalence of Tick-Borne Pathogens from Punjab, Pakistan

10:56-11:04	**Kiran Aftab** University of Gujrat, Gujrat, Department of Zoology	Biodiversity of Ticks Associated with Cattle in Gujrat, Punjab, Pakistan
11:04-11:12	**Iram Liaqat** Microbiology Laboratory, Department of Zoology, Govt. College University, Lahore	AI-2 signaling controls Biofilm formation in marine organisms
11:12-11:20	**Qamer Mahmood** University of Veterinary and Animal Sciences, Lahore, Pakistan	An Epidemiological Study of Potential Risk Factors Associated with Cystic Echinococcosis in District Narowal, Pakistan – A One Health Approach
11:20-11:28	**Kiran Aftab** University of Gujrat, Gujrat, Department of Zoology	Biodiversity of Ticks Associated with Cattle in Gujrat, Punjab, Pakistan
11:28-11:36	**Muhammad Farhab** College of Veterinary Medicine, Yangzhou University, Yangzhou, Jiangsu (225009), China	CD209a potentiates cell-mediated immunopathology in a helminthic disease through DCSIGN- and Dectin-2
11:36-11:44	**Muhammad Nasir Bhaya** Mavişehir veterinary clinic İzmir, Turkey	Histiocytic Sarcoma: A Male Guinea Pig
11:44-11:52	**Tanveer Ahmad** Faculty of Veterinary Sciences, Bahauddin Zakariya University, Multan, Pakistan	ctiveness of Ozone Treatment in Curing Uterine Infections and Associated Mastitis in Dairy Animals
11:52-12:00	**Zeeshan Nawaz** Department of Microbiology, Government College University Faisalabad	Epidemiology of *Giardia lamblia* in Children Exhibiting Diarrhea
12:00-12:08	**M. Asif Rana** Bahauddin Zakariya University, Multan, Pakistan	Molecular Detection of *Anaplasma marginale* and *Theileria 20nnulate* in blood samples of horses and donkey collected from Dera Ghazi Khan
12:08-12:16	**Riaz Ahmed Gul** University College of Veterinary and Animal Sciences, The Islamia University of Bahawalpur, Bahawalpur, Punjab, Pakistan	Mastitis: Bacteria Involve, Risk Factor, Causes and Control, One Health
12:16-12:24	**Muhammad Usman Zaheer,** Surveillance Lead (Animal Health) The Fleming Fund Pakistan Country Grant on AMR Health Security Partners	Role of Veterinarian in One-Health

Session No. 4 (Emerging infectious diseases with special focus on SARS-CoV-2) 02:00 – 04:00 pm (PST) GMT+5

Session Chair: Prof. Dr. Shahid Munir, Vice-Chancellor, University of Jhang, Jhang

Email: vc.uojhang@gmail.com

Co-Chair

1. **Prof. Dr. Nusrat Jahan, Prof. Emeritus, GCU, Lahore**
2. **Prof. Dr. Farkhanda Manzoor, Zoology, LCWU**
3. **Prof. Dr. Kamran Ashraf, Chairman Deptt. Of Parasitology, UVAS, Lahore**

4. **Dr. Abid Hussain Shehzad, Associate Professor, Theriogenology Section, Department of Clinical Sciences, College of Veterinary and Animal Sciences, Jhang**

Moderator:

Dr. Usman Waheed, Department of Pathobiology, College of Veterinary & Animal Sciences, Jhang, Pakistan

Oral Presentation Session 04 Evaluation Committee

1. **Dr. Saim Hamid, VC, Fatima Jinnah Women University, Rawalpindi**
2. **Rao Zahid Abbas, Associate Professor, FVS, UAF**
3. **Mian Yaqoob Jan, Physical Rehabilitation Field officer, International Committee of the Red Cross (ICRC), Peshawar**
4. **Dr. Kazim Ali, Lecturer, Department of Pathobiology, CVAS, Jhang**

02:00-02:08	**Jean-Paul Gonzalez,** School of Medicine, Georgetown University, Washington DC, USA	One Health, times of the Pandemics: Covid-19 finally encourages the integrative health paradigm.
02:08-02:16	**Joseph J. Bove** President of Advanced Technology Corp	A Unique Partnership between Veterinary Diagnostic Laboratories and large US Universities as a response to COVID 19
02:16-02:24	**Dr. Taira**, Invited Speaker, Japan.	Parasitic zoonoses in Japan.
02:24-02:32	**Muhammad Faizan Elahi Bhatti** University of Veterinary and Animal Sciences, Jhang campus	One health: The interface between veterinary and human health with Covid-19 perspectives.
02:32-02:40	**Muhammad Farhab** College of Veterinary Medicine, Yangzhou University, Yangzhou, Jiangsu (225009), China.	Camel brucellosis: a zoonotic reemerging disease: limitations of diagnostic and monitoring approaches
02:40-02:48	**Muhammad Adil Rasheed** Department of Pharmacology and Toxicology, University of Veterinary and Animal	Antioxidant, Anticancer and Genotoxic Evaluation of Aqueous Extract of *Opuntia Dillenii* Stem
02:48-02:56	**Naveeda Akhter Qureshi** Department of Zoology, Quaid-i-Azam University, Islamabad Pakistan	Spatiotemporal patterns of Cutaneous Leishmaniasis in the District Upper and Lower Dir, Khyber Pakhtunkhwa, Pakistan: A GIS-based Spatial Approaches
02:56-03:04	**M. Khalid Farooq Salamat** The Roslin Institute, R(D)SVS, University of Edinburgh, Easter Bush, Midlothian, EH25 9RG, UK.	Detection of seeding activity in preclinical blood samples from BSE-infected sheep using protein misfolding cyclic amplification (PMCA)
03:04-03:12	**Mubashar Hussain** University of Gujrat, Gujrat, Department of Zoology	Prevalence, Isolation and Characterization of *Anaplasma marginale* in Cattle from District Gujranwala, Pakistan
03:12-03:20	**Shaheen Shahzad** Genomics Research Lab Department of Biological Sciences, International Islamic University, Islamabad, Pakistan	Association of HLA DRB1 15 Allele with The Risk of HBV Infection In Pakistani Population
03:20-03:28	**Abdul Ghaffar** Department of	Molecular Docking and Characterization of *Carica papaya* Bioactive

	Biochemistry, Government College University, Faisalabad, 38040, Pakistan	Compounds as Potential Inhibitors of Dengue NS2B, NS3 and NS5 Protease in Mice Model
03:28-03:36	**Ayesha Zaka** Genomics Research Lab, Department of Biological Sciences, International Islamic University, Islamabad, Pakistan.	A Novel Homozygous Frameshift Mutation in The *Dcc* Gene In a Pakistani Family with Autosomal Recessive Horizontal Gaze Palsy with Progressive Scoliosis-2
03:36-03:44	**Shumaila Kiran** Department of Applied Chemistry, Government College University, Faisalabad-38000, Pakistan	Green synthesis of nickel oxide nanoparticles using *Allium cepa* peels for degradation of Congo Red Direct Dye: An environmental remedial approach
03:44-03:52	**Muawuz Ijaz** Department of Animal Sciences, CVAS-Jhang	Influence of animal handling before slaughtering on meat quality characteristics of beef
	35200, University of Veterinary and Animal Sciences, Lahore, Pakistan	
03:52-04:00	**Safdar Ali Mirza** GC University; Lahore, Botany Department	Antioxidant and Anticancer Potential of Tannins from Callus Cultures of *Achyranthes aspera* L.
04:00-04-08	**Aqsa Zahoor** College of Veterinary and Animal Sciences, Jhang	Comparative efficacy of COVID-19 and MERS

CONCLUDING CEREMONY PROGRAMME

26th November, 2020 (Wednesday) 04:00 -04:30pm (PST= GMT+5)		
When	**What**	**Who**
04:00 – 04:03 pm	Recitation from Holy Quran	Mr. Abid Zeeshan M.Phil Pathology, CVAS, Jhang
04:03 – 04:08 pm	Outcomes of the Conference	Prof. Dr. Muhammad Fiaz Qamar, Chairman Pathobiology/ Organizing Secretary
04:08 – 04:10 pm	Comments by the Principal, CVAS, Jhang	Prof. Dr. Abdul Shakoor, Principal, College of Veterinary & Animal Sciences, Jhang
04:10 – 04:15 pm	Comments by the Prof. Dr. Akram Munir	Prof. Dr. Akram Munir Riphah College of Veterinary & Animal Sciences, Lahore, Pakistan
04:15– 04:20 pm	Concluding Address by Vice Chancellor, UVAS, Lahore	Prof. Dr. Nasim Ahmad, *S.I.* Vice-Chancellor University of Veterinary & Animal Sciences, Lahore, Pakistan.
04:20 – 04:30 pm	Final Address by Chief Guest	Prof. Dr. Khalid Masud Gondal, Vice Chancellor, King Edward Medical University, Lahore

Molecular Docking and Characterization of *Carica papaya* Bioactive Compounds as Potential Inhibitors of Dengue NS2B, NS3 and NS5 Protease in Mice Model

Abdul Ghaffar[1*], Bushra Munir, Sadaf Naeem, Muhammad Umar Farooq, Aysha

[1]*Department of Biochemistry, Government College University, Faisalabad, 38040, Pakistan*

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Dengue is one of the leading causes of health problems across the globe due to a lack of effective treatment to control it. This study reports computational screening and *in-vivo* characterization of 900 bioactive *Carica papaya* phytochemicals against dengue NS2B/NS3 serine. *C. papaya* extracts were fed to *Sprague Dawley rats* followed by histopathological and biochemical analyses. All doses of the extract significantly increase the platelet counts, hematological and biochemical parameters. Histopathological study revealed that no toxic effects on vital organs of *Sprague Dawley Rats*. The analysis shows the potential of phytochemicals from *C. papaya* for possible anti-dengue agents in pharmaceutical as well as the nutraceutical industry.

Keywords: Phytochemicals, ADMET, Serine protease, CBC

Low-Level Laser Therapy Diminishes Symptoms of Doms But Does Not Improve Muscular Performance

Kirran Sikandar Gondal[*1], Muhammad Mustafa Qamar

Department of Allied Health Sciences, Sargodha Medical College, University of Sargodha, Sargodha.

Presenting Author: Kirran Sikandar Gondal
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The study aimed to evaluate the effects of low-level laser therapy on symptoms of exercise-induced muscle soreness and early recovery in wrist flexors of untrained young adults. A randomized controlled trial was performed in which 16 healthy volunteer participants were recruited into two equal groups. Pain, ROM, Grip Strength, Pressure pain threshold, and perceived soreness were analyzed. The assessment was performed before exercise protocol, 1 hour and 24, 48, 72, 96,120, 144,168, and 192 hours after eccentric exercise at the same time of the day. LLLT was applied immediately after the induction protocol. Ibuprofen gel was applied conservatively to both control and treatment groups. A significant time effect was observed in both groups (<0.05). Perceived pain intensity was less in low-level laser therapy compared to the control group (0.05). No changes were observed in any parameter. Low-level laser therapy is effective in diminishing symptoms of DOMS.

Keywords: Laser, DOMS, Muscular Performance, Grip Strength.

Detection and Prevalence of Tick-Borne Pathogens from Punjab, Pakistan

Shabab Nasir[1*], Marriam Batool[1]

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Ticks are the second to mosquitoes as vectors of several human and animal pathogens like viruses, spirochetes, bacteria, rickettsia, protozoa, and filarial nematodes, etc. Important tick-borne diseases are Crimean Congo hemorrhagic fever, anaplasmosis, theileriosis, and babesiosis that cause mortality in humans and animals. So, this study was carried out to check the prevalence of tick-borne diseases in Punjab, Pakistan. Three districts were selected from each of four zones of Punjab. The total of 120 livestock farms were randomly selected from 12 districts, 10 from each district. The tick samples were taken to the research laboratory in clean and dry appropriately labeled plastic bottles with muslin at the top for proper aeration. In the laboratory, the process of preservation was carried out by keeping ticks into 70% methanol. Based on morphology the collected ticks were distinguished microscopically with the help of a dichotomous key. For molecular studies, ticks from each species were individually used for the extraction of DNA. Extracted DNA of ticks was stored at –20ºC. The tick pathogens were confirmed by PCR using specific primers. The prevalence of overall evaluations of tick-borne pathogens in all agro-ecological zones was significantly different. The highest prevalence was found in *Ehrlichia spp.* (16%) followed by*Anaplasma spp.* (9.1%), *Theileria spp.* (9.03%) and *Babesia spp.* (4.14%). It was concluded that there is a wider variety of ticks and tick-borne pathogens in Pakistan. In the case of control experiments, extracts of selected plants (*Calotropisprocera*, *Citrullus colocynths*, *Brasicarapa*, *Solanumnigrum*and*Trigonellafoenum-graceum*) also showed promising results along with acaricides.

Keywords: Tick-Borne Diseases, Crimean Congo hemorrhagic fever, *Brasicarapa*.

Social Support as a Predictor of Quality of Life and Mental Health among Females with and without Menstruation Problems: A Comparative Study

Umara Rauf[*1]

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The present research aimed to explore the difference between social support, mental health (Depression, Anxiety, and Stress), and quality of life among females with and without menstruation problems. Based on the literature review it was hypothesized that (1) there will be a significant difference among females with and without menstruation problems on the variable of social support and its sub-scales. (2) There will be a significant difference among females with and without menstruation problems on the variable of mental health and its sub-scales. 3) There will be a significant difference among females with and without menstruation problems on the variable of quality of life and its sub-scales. A purposive sample of 408 females (202 with menstruation problems and 206 without menstruation problems) was recruited from academic institutes, hospitals, and different areas of Sialkot. A self-demographic sheet was administrated along with the Multidimensional Scale of Perceived Social Support, Quality of Life, Depression Anxiety, and Stress Scale. For the analysis of data, Descriptive Statistics and t-test were used. The results revealed that there was a significant difference among females with and without menstruation problems on the variables of quality of life and mental health and their sub-scales ($p < 0.05$) hence, social support has no significant difference among females with and without menstruation problems ($p > 0.05$). This research will help promote mental health and improve the quality of life of females during Menstruation problem as well as in their normal life. Further, it will helpful for mental health practitioners and medical health practitioners to provide better services to enhance their quality of life and mental health through counseling.

Keywords: Females, Menstruation problems, Quality of Life, Mental Health, Social Support.

Antimicrobial Resistance Patterns in Bacterial Isolates for Designing Empirical Therapy from a Tertiary Health Care Unit of Lahore

Arslan Arshad*[1], Ali Sharif[2*], Zikria Salem[1], Bushra Akhtar[3], Humaira Majeed Khan[2]

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[3]*Department of Pharmacy, University of Agriculture Faisalabad.*

Corresponding Author/Presenting Author: Ali Sharif

Antibiotics are used to treat bacterial infections. The resistance to antibiotics is the most concerned issue regarding the treatment of bacterial infections. The resistance in the developing countries is a major concern for the WHO as the usage of antibiotics is almost inappropriate and unscheduled. The main objectives of the study were to determine the resistance pattern of bacterial isolates to facilitate empirical therapy. Present was conducted at Ghurki trust and teaching hospital located in the periphery of Lahore. Culture sensitivity reports of 880 in-patients were collected from the laboratory of the hospital. Data included 526 male and 354 female patients. Majority of reports were from pus samples i.e. 78 percent. 6 clinically important bacteria were included in the study *Acinetobacter baumannii, Escherichia coli, Klebsiella pneumoniae Proteus mirabilis, Pseudomonas aeruginosa, Staphylococcus aureus*. These bacteria were tested against 45 antibiotics depending upon their spectrum following CLSI guidelines. Most abundant microbes found in the study was *Staphylococcus aureus* (34.5%). *Escherichia coli*, was the second most abundant bacteria present in 219 samples (24.9%). Data was divided to determine the sensitivity pattern in four different age groups. Ampicillin was found to be the least sensitive antibiotic (percentage sensitivity of 8.1%). Ciprofloxacin was only 32.3% sensitive against *Escherichia coli*. Clarithromycin was only 28.7% sensitive asa whole whereas found to be 100% resistant against *Escherichia coli* in 24 tested cases. Data suggested fosmomycin as the most sensitive antibiotic having a remarkable percentage sensitivity of 96.2% out of 130 tested cases. Polymixin B, colistin, linezolid, and vancomycin showed percentage sensitivity above 80%. Present study concluded that antibiotic options are very limited because of the emergence of multi-drug resistant pathogens. However, this data will be helpful in designing an empirical therapy plan and managing the preventive measures to combat this potential threat. Furthermore, there is need to take multifaceted steps in order to rationalize the use of antibiotics.

Keywords: Antimicrobials, Resistance, Bacteria, Therapy.

Comparative Efficacy of COVID-19 and MERS-CoV

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MERS (Middle East respiratory syndrome), a severe respiratory illness belong to family coronavirus. Major signs include asphyxia, cough and fever. Recent researches found out that clinical presentation of MERS is similar to covid-19 except one main difference that fatality rate of MERS is 35% and of COVID-19 is 2.3% while spread of COVID-19 is more as compared to MERS. SARS and MERS cause more severe symptoms than COVID 19. COVID-19 results from SARS-coV-2 but MERS from MERS-CoV, both originated from bats found in researches. Much control on MERS has occurred but localized outbreak is still occurred. To develop COVID- 19 treatment the national institute of allergy and infectious diseases is on research for SARS and MERS. Dromedary camel is considered as reservoir animal and source of MERS-CoV infection in humans. Rajastan in India contain largest population of dromedary camel and Punjab shared border with it. As Pakistan have more than 1 million populations of dromedary camels. During 2012-2015, 565 serum samples were collected from 9 district of Punjab in Pakistan and Elisa was performed while 223 were confirmed by MN (Micronutralzation). In 2015-2018 research total 1820 samples were collected 776 from nasal and 1050 from serum of camels. Elisa and RT-qPCR were performed, from which 794 seropositive were detected. In 2017 research, 2000 cases and in 2018 18 new cases of MERS-CoV reported in human in Pakistan In 2019 research, 12 out of 100 camel handler families were detected as seropositive. In 2016-2017 research, 2409 samples of human serum collected from 4 provinces of Pakistan from which 840 were camel handlers. Conclusion was that almost 75.62% of antibody positive dromedaries found in Pakistan. But in humans neutralizing antibodies were not detected.

Keywords: MERS, COVID-19, Outbreaks, Dromedary Camel, Human, Pakistan.

Molecular Epidemiology of *Theileria annulata* Infection of Cattle in Layyah District, Pakistan

Asia Parveen[*1], Sehrish Ashraf, Furhan Iqbal
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Theileria annulata is the cause of tropical theileriosis in cattle in Pakistan, where it has a significant impact on the cattle industry. Here we report the molecular detection and seasonal prevalence and blood parameters of *T. annulata* infection in crossbreed, Holstein Frisian and Sahiwal breed in Layyah District in the Punjab. A total of 844 blood samples (Cross = 244, Holstein Frisian = 300, Sahiwal breed = 300) collected in 2017 and 2018 were tested. Blood smear screening revealed 125/844 (15%) of cattle positive for *Theileria* species. PCR amplification of cytochrome b gene indicated an overall *T. annulata* prevalence of 21% (174/844). The highest prevalence was observed in autumn (53%) followed by winter (20%), summer (14%) and spring season (3%). Crossbreed cattle were the most susceptible to *T. annulata* (28%) followed by Sahiwal (19%) and Holstein Frisian. Representative partial cytochrome b gene sequences of *T. annulata* revealed phylogenetic similarities with sequences submitted from India, Iran, China, Turkey and Spain. Small number of ticks including *Hyalomma anatolicum*, *Hyalomma* excavatum, *Rhipicephalus microplus*, *Haemaphysalis punctata* was identified from cattle but none of them was found PCR positive for the presence of *T. annulata*. Analysis of the hematology data indicated that red blood cell, hemoglobin, mean cell hemoglobin, mean corpuscular hemoglobin, lymphocyte (%), monocyte (%) and platelet count were significantly altered in *T. annulata* positive cattle of all three breeds. Screening of cattle by PCR for the detection of *T. annulata* is recommended for diagnosis and treatment.

Keywords: Cytochrome b gene; PCR; *Theileria annulata;* Phylogenetic analysis

Epidemiological Investigation of Norovirus in Children and Its Associated Risk Factors in District Lahore, Punjab-Pakistan

Ammar Yasir[1*], Muhammad Hassan Mushtaq[2], Ubaid Ur Rehman Zia[3], Qamar Mehmood[4,] Noor Ul Hudda[5]

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Diarrheal diseases are responsible for a significant amount of children deaths. Although, rotavirus is recognized as a major cause for pediatric diarrhea, but the role of other viruses especially *norovirus* is still unrecognized for the Pakistani population. *Norovirus* is very contagious and can affect a vast range of species ranging from cattle, pigs, dogs, mice, cats, sheep, and lions to humans. In humans it causes vomiting and diarrhea and can affect the people of all ages but mainly the children with less than five years of age. There is no significant data available regarding the prevalence and genetic variability of *norovirus* in Pakistan. This study was based on hospital surveillance, from December 2019 to September 2020 for the detection of *noroviruses* in children of less than five years of age. Total 100 samples were collected with predesigned questionnaire to assess the risk factors and clinical characteristics related to *noroviruses*. Total 15% samples were detected positive by the confirmation of RT-PCR for genogroup GII (G2SK) which is most prevalent. From all the risk factors including age, gender, vomiting, fever, type of milk, water and meal consumption, habit of hand, vegetables and fruits washing; only the contact of patient with an acute gastroenteritis patient was found significant. The remarkable cases of childhood diarrhea associated with *noroviruses* calls for the large-scale epidemiological surveys to calculate the burden of *noroviruses* and assess the risk factors. As it is a food borne pathogen so there is also a need to follow the strict hygienic measures during the processing of food items.

Keywords: *Norovirus,* Acute gastroenteritis, Food borne, Pediatric diarrhea

Peel Extract of *Citrus paradisi* Based Nanoparticles as Therapeutic Alternatives for Wound Infections

Bushra Akhtar [1*], Faqir Muhammad [2], Ali Sharif [3], Rehman Nazir [2]

[1] *Department of Pharmacy, University of Agriculture, Faisalabad*
[2] *Institute of Physiology and Pharmacology, University of Agriculture, Faisalabad*
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Antimicrobial resistance is an emerging problem now a days. Contaminated wounds pose a great threat for health of human beings. Nanotechnology has played a great role in the treatment and diagnosis of different diseases. The study is based on the synthesis of nanoparticle based therapeutic alternative for treatment of contaminated wounds by using fruit peels. *Citrus paradisi* (Grape fruit) is one of the most important and well cultivated fruit in Pakistan. The peel of citrus fruits has many valuable ingredients. This byproduct (peel) has many important chemicals such as phenolic compounds, flavonoids, carotenoids, vitamin A and C, essential oils, etc. Aqueous extract of grapefruit peel was prepared by maceration. By using the peel extract of grapefruit, nanoparticles were prepared with sulfur as reducing agent. Micro emulsion method was used for preparation of these nanoparticles. Nanoparticles were characterized for hydrodynamic size. Compatibility of constitutive components was assessed by Fourier transform infrared spectroscopy (FTIR) techniques. Antioxidant potential was studied by DPPH assay. *In vitro* antibacterial potential was assessed by minimum inhibitory concentration (MIC) against *E. coli* and *Staphylococcus aureus*. *In vivo* studies were conducted in rabbits by giving them incision wounds. The animals were treated with daily application of these nanoparticles. Wound scoring was calculated daily until complete healing of wound. After healing, oxidative stress was determined in skin biopsy samples. Animals were sacrificed and histopathological investigations were conducted. The animals administered with nanoparticles showed significantly good healing in comparison to commercially available ointment. We conclude that our nanoparticles prepared from peel extract of *Citrus paradisi* have good potential of healing wounds and can be employed as therapeutic alternative for treatment of contaminated wounds.

Keywords: Peel Extract, Nanoparticles, Antimicrobial, Wound Infections.

Phytochemical Analysis and *In Vitro* Activity of *Azadirachta indica* extract against Methicillin Resistant *Staphylococcus aureus* and Methicillin Resistant *Staphylococcus epidermidis*

Saba Naeem[1], Abu Baker Siddique[1], Saima Muzammil[1], Muhammad Kashif Zahoor[2], Zeeshan Nawaz[1], Muhammad Waseem[1], Waqas Ahmed Madni[1], Aysha Yasmin[3] and Muhammad Asif Zahoor[1*]

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In this cross-sectional study, the isolation and molecular identification of methicillin resistant *Staphylococcus aureus* (MRSA) and methicillin resistant *S. epidermidis* (MRSE) was described from infected wounds (n=100). The bacterial isolation was done by conventional microbiological procedures followed by amplification of 16S rRNA gene to identify the species of the isolates. Methicillin resistance was determined using cefoxitin discs and the resistant isolates were screened for chromosomal *mec*-A gene followed by determination of minimum inhibitory concentrations (MIC) of vancomycin using E-strips. In the second phase, we characterized the aqueous extract of *Azadirachta indica* leaves using Fourier Transformed Infrared Spectroscopy (FTIR-Spectroscopy) and investigated the *in vitro* activity. A total of 28 *Staphylococcus* isolates were identified on the basis of conventional methods. Amplification and sequence analysis of 16S rRNA gene confirmed *S. aureus* (22), *S. epidermidis* (3) and *S. saprophyticus* (3) isolates. Cefoxitin discs showed (7/22) MRSA, (3/3) (MRSE) and none of the methicillin resistant S. *saprophyticus.* MRSA and MRSE isolates also showed the presence of *mec*-A gene. However, all isolates were found sensitive to vancomycin MIC (0.5-2µg/ml) and also sensitive to linezolid. The FTIR- Spectroscopy of *A. indica* extract confirmed the considerable concentration of *Azadirachtin*. The mean zone of inhibition was measured as 14.23±1.37 and 13.66±0.70 against MRSA and MRSE isolates, respectively. Altogether, it is concluded that MRSA and MRSE is alarming public health concern with molecular evidence of the *mec*-A gene. However, vancomycin and linezolid were found effective and extract of *A. indica* leaves also showed *in vitro* antimicrobial activity.

Keywords: *Azadirachta indica*, Methicillin Resistant *S. aureus* (MRSA), Methicillin Resistant *S. epidermidis* (MRSE), Minimum Inhibitory Concentration (MIC)

Comprehensive management analysis of the Coronavirus disease (COVID-19) in Pakistan

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This article presents an update on the rapidly changing situation of the coronavirus disease in all provinces of Pakistan along with the capital city of Islamabad. The most affected cities (almost 20) were declared as hotspots for the coronavirus disease. This study highlighted, in details, the shared symptoms of the COVID-19 with previous diseases; and steps (economic, social, environmental, cure, treatment, prevention, and medical facilities) taken by Government of Pakistan to cope up the pandemic. The current coronavirus disease pandemic (COVID-19) was first observed in Wuhan, Hubei province of China, caused by a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization announced the disease as a public health emergency on 30 January 2020 day of 2020 and declared it a pandemic on 11th of March 2020. However, in Pakistan, the first case of the disease was registered on 26th of February 2020 when a student returned home from Iran via Taftan border a city along Pakistan and Iran, and the first death was registered on 18th of March 2020. Among the provinces in Pakistan, Province of Sindh was the most affected by the disease as the province shares boundary with Iran (that was highly affected by the coronavirus disease before any incidence was reported in Pakistan). As of 18 July 2020, in Pakistan, a total of 263,496 cases of COVID-19 were registered out of which 204,276 were recovery cases and 5,568 were death cases. This review presented the update on rapid changing situation in all provinces of Pakistan along with the capital city of Pakistan. Most affected cities (almost 20) were declared as hotspots for corona virus in Pakistan. This study highlighted the contagion of corona virus; furthermore, shared symptoms of disease with previously outbroken diseases and steps taken globally were discussed in detail. A detailed and comprehensive information was presented in this paper about management (Economic, social, Environmental) and clinical decisions (cure, treatment, prevention, medical facilities) taken by Government of Pakistan to cope up the situation.

Keywords: Corona virus, Recoveries, Management, Analysis, Pandemic, Pakistan

Isolation, Identification and Quantitative Analysis of Bacteria Present on Kitchen Dish wash Sponges of Hotels, Hostels, Café and Student Mess setups in District Jhang, Pakistan

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The kitchen sponges are not as clean as we consider them due to their porous and water soaking nature which makes them an ideal hub of microorganisms. Kitchen sponges are a major source of cross-contamination. This study was conducted to detect the presence of different bacteria on kitchen dish wash sponges. A total (n=364) sponge samples were collected from different kitchens of hotels, hostels, café, and mess setups located in District Jhang before washing and after washing the kitchen utensils. Bacterial identification and quantification were made through, Gram staining, biochemical tests (IMViC test), and total viable count (TVC) method. Among the total of 50 bacterial isolates, *Escherichia coli* (30.0%), *Klebsiella spp.* (20.0%), *Staph. aureus* (14.0%), *Micrococcus spp.* (14.0%), *Staph. epidermidis* (6.0%), *Salmonella spp.* (6.0%), Moraxella *spp.* (6.0%) and *Shigella spp.* (4.0%), were identified. Kitchen sponges were extremely contaminated with pathogenic bacteria which could be transferred from the kitchen environment to food contact surfaces and thus could lead to food contamination.

Keywords: Kitchen Sponges, Cross Contamination, Pathogenic Bacteria, Disease Outbreaks

Prevalence of Subclinical Mastitis in Cattle in and Around Multan

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Mastitis (inflammatory reaction of the udder tissues) is the most common and the most important disease of economic significance in the dairy industry all over the world. Therefore, present study was designed to find the prevalence of mastitis in and around Multan. A total of 100 dairy cows were sampled during the period from July 2018 to October 2018 from different local dairy farms at Multan. After screening with CMT test, milk samples from mastitic animals were cultured and subjected to microbiological examination. Milk samples were not taken from animals treated with antibiotics by any route until 96 hours of treatment. Over all, the Quarter-wise and animal-wise occurrence of mastitis was determined by using the California Mastitis Test. The animal wise overall prevalence of subclinical mastitis in cows was 38 % and quarter wise prevalence of subclinical mastitis was 36.20%, respectively. Mastitis in front left quarters was 34.40%, right front quarters 31.60%, while left rare quarters 41% and right rear quarters 38%. Bacteria *Staphylococcus, Streptococcus, Corynebacterium, Eterococci, Salmonella, Bacillus, Klebsiella and Pseudomonas* were isolated from infected samples. *Staphylococcus aureus* was top-ranking isolated bacteria among all mastitigens followed by *Strept. agalactiae* and *E.coli*. It was concluded that subclinical mastitis was widely prevalent in Multan city. This study will help the farmers to adopt effective measures to control mastitis.

Keywords: Prevalence, Subclinical Mastitis, Multan, California Mastitis test, Mastitis Microbiology

An Epidemiological Study of Potential Risk Factors Associated with Cystic Echinococcosis in District Narowal, Pakistan – A One Health Approach

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Cystic Echinococcosis is a parasitic disease caused by *Echinococcus granulosus* (a cestode) of the genus *Echinococcus* (family taeniidae). It is a serious zoonosis that results in enormous economic damages to livestock industry and poses a serious threat to public health. It can affect an extensive variety of hosts including humans, domestic and wild animals. It has worldwide distribution including Pakistan. Pakistan is an agrarian country and about 70% people are settled in pastoral areas with restricted access to appropriate salubrious services. These settings may errand the epidemics like echinococcosis. Keeping in view the threats caused by hydatidosis to livestock and public health, Current study was designed to gain insights about detailed investigation of the epidemiological risk factors associated with this disease. A pre-structured Questionnaire was used to collect data from 503 animal owners (226 cattle, 98 sheep, 102 buffalo and 77 goats) mainly farmers and butchers by visiting various abattoirs of district Narowal - Pakistan between September 2019 and February 2020 to identify the epidemiological risk factors and their association with the disease. Collected data was analyzed through Fishers Exact Test and chi-square using Statistical Software R. Out of 23 variables, 6 variables showed significant association (p-value < 0.05) with the development of Cystic Echinococcosis. These variables were specie of animal, age, feeding pattern, dog keeping, presence of stray dogs at grazing site and distance from nearest abattoir. The Epidemiological findings of this study could help in developing prevention strategies and control programs for Hydatidosis in Pakistan. An integrated One Health approach - involving the livestock department, public health personnel, healthcare providers, environment science officials and animal owners - is needed to help prevent Hydatid disease in the region. Establishment of policy on dog keeping and handling, promoting construction of abattoirs with an obligatory meat inspection services are highly essential. Control measures should emphasize the interruption of the parasite transmission. Due to the lack of knowledge about echinococcosis transmission, intervention measures should focus on educating the human population, dog owners and communities considered at a high risk of infection with *E. granulosus.*

Keywords: *Echinococcus Granulosus*, Epidemiology, Food Animals, Abattoir, Narowal

Effectiveness of Ozone Treatment in Curing Uterine Infections and Associated Mastitis in Dairy Animals

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The current study has been planned to find the association between uterine infection and mastitis; compared effectiveness of ozone treatment in curing uterine infection and mastitis with antibiotic. In experiment I two hundred dairy cows of local breed were screened for mastitis during the puerperium period (≤40 days postpartum) and uterine samples were taken from those cows which were positive for mastitis. Both uterine and milk samples were cultured on blood agar containing 5% sheep blood separately. Different color, appearance and type of bacterial colonies were observed and characterized. Bacteria were present in both uterine and milk sample and further confirmed by Gram staining and biological test. Out of 57 mastitis positive animals 11 animals shared same pathogen in both uterine infection and mastitis. *Staphylococcus* and *streptococcus* were common in 7 and 4 animals respectively. This result showed that there was significant (P > 0.05) association between uterine infection and mastitis on the basis of common pathogen. In experiment II 52 animals either suffering from mastitis or uterine infections were randomly divided into two equal groups (M and U). Each group was then further divided into two subgroups (MA or MO and UA or UO) to receive either antibiotics or ozone therapy. The mastitic animals in MA groups were treated with antibiotic intramammary twice a day for five days whereas, MO group was treated with intramammary infusion of ozone for single time. Milk samples were collected at 7th, 14th and 21st day post-treatment for CMT to check the efficiency of each treatment regimen. The cure rate was 23.1% and 53.8% in MA and MO group respectively. These results revealed that there was no significant difference (P = 0.226) between antibiotic treatment and ozone treatment. Similarly, animals in UA group were treated with antibiotic intrauterine twice a week for the period of two weeks whereas the animals in UO group were treated with intrauterine ozone for 10 second for four times during a week. All the animals in UA and UO groups were treated with ovsynch estrus synchronization protocol (GnRH-PGF2α-GnRH) on 14th day after the start of ozone or antibiotic treatment. The efficiency of each treatment regimen was determined on the basis of estrus response and pregnancy rate. Estrus response in UA and UO group was 46.2% and 61.5% respectively. This result revealed that there is no significant difference (P = 0.695) between antibiotic treatment group and ozone treatment. Similarly, Pregnancy rate was 33.3% and 62.5% in UA and UO group respectively. This result showed that there was no significant difference (P = 0.592) between antibiotic treatment group and ozone treatment.

Keywords: Ozone, Uterine Infections, Mastitis, Dairy Animals

A Study to Develop Foot Pressure Scanner in early Identification of Pressure Points in Diabetics

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Diabetics are more prone to foot ulcers with a 25 % higher risk than Non-diabetics. Ulceration is a precursor to lower extremity amputation. Amputees go through physical and psychological anguish, which incite the burden of medical expenditure, loss of productivity and low quality of life. Hence preventive measures to be directed towards identification of high pressure zones on the plantar surface and offload the elevated plantar pressure by using offloaded footwear, to prevent ulceration. Hence the researcher perceived the need to develop a simple, user friendly, cost effective, practical device, which may be used by physicians, surgeons, nurses, and paramedical staff or in the home setting. To develop a device in collaboration with biomedical engineers, to measure static and dynamic foot pressure. And to test the reliability and validity of the device in measuring plantar pressure. Case Series Research Design was adopted for the study. Sequential Sampling Technique. 110, which were determined by power analysis. Diabetics, Non-diabetics, Diabetics with peripheral neuropathy, Diabetics with plantar ulcers. The static and dynamic pressures were assessed with mean and SD. The differences were analyzed using analysis of variance (ANOVA) within the study groups for reliability and between study groups for validity. The differences occurred among the four groups were studied by applying t-Test. The assumptions were checked for normality of static and dynamic foot pressures using box plots. Foot pressures at $P_{0,}$ $P_{1,}$ and P2 were compared using multiple bar charts. The IBM SPSS 22 and Excel spreadsheet was used for data analysis. The innovative, portable, cost effective foot pressure scanner found useful in measuring the static and dynamic foot pressure, which will help the patient to use offloaded shoes to reduce plantar pressure.

Keywords: Presseure Scanner, Ulcers, Diabetes, Non-diabetics, Peripheral neuropathy

Incidence and Molecular Characterization of Extended Spectrum Beta Lactamase (ESBL) Producing Isolates in Avifauna of District Jhang

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Extended spectrum beta lactamases (ESBL) are the enzymes found in many gram-negative bacteria belonging to the family Enterobacteriaceae. ESBL are responsible for hydrolysis of β lactam antibiotics (Penicillin and cephalosporins). CTX-M, TEM and SHV are the major groups found in Class A, ESBL enzymes. Encoding genes serve as genetic marker for surveillance of resistant isolates. In present study, surveillance and molecular characterization of ESBL bacteria was carried out at avian-human interface in district Jhang. Representative bird species included *Corvus splendens, Acridotheres tristis, Columba livia, Coturnix coromandelica, Ardea alba* and *Passer domesticus*. A total of 120 fecal swab samples (n=20 from each species) were collected. Fecal swabs were enriched in nutrient broth supplemented with cefotaxime (4mg/liter) and later streaked on MacConkey agar. Colonies obtained from MacConkey agar were phenotypically confirmed as ESBL by using combination disc test (CDT). Multiplex PCR (mPCR) was used to identify ^{bla}CTX-M, ^{bla}TEM and ^{bla}SHV genes. ESBL isolates were detected in 28.3 % (n=34) samples. Multiplex PCR (mPCR) detected ^{bla}CTX-M gene in 41.2 % (n=14), ^{bla}TEM gene in 23.5 % (n=8) and ^{bla}SHV gene in 8.8 % (n=3) of ESBL isolates. CTX-M gene and TEM co-existed in 17.6 % (n= 6) isolates. Among bird species, prevalence of ESBL isolates was recorded highest in *Corvus splendens* (65%) followed by *Acridotheres tristis* (55%), *Ardea alba* (35%) and *Columba livia* (15%). This study revealed the existence and spread of ESBL bacteria among different bird species residing in urban towns. There is dire need for further surveillance of avian-human interface sites to limit possible spread of resistant bacteria from avian species to human beings.

Keywords: ESBL, Molecular Characterization, Avifauna, Jhang

Fluoroquinolone-Resistant Campylobacter Species of Poultry, An Evolving Public Health Challenge

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The bacterium Campylobacter is normally found in the digestive tract of many farm animals including poultry. It is important to understand the occurrence of this bacterium in poultry, as they play a role in transmission to humans. Mishandling of raw poultry meat and consumption of undercooked poultry are the major risk factors for human campylobacteriosis. The development of antimicrobial resistance (AMR) in *Campylobacter jejuni* and *Campylobacter coli* is a growing public health challenge. This study aimed to determine the prevalence and antibiotic resistance patterns of *Campylobacter*. A total of (n=150) cloacal samples collected from small chicken flocks, were processed for the presence of *Campylobacter* using culture, biochemical tests, and species-specific PCR. Overall, 51% (77/150) samples were found contaminated with *Campylobacter* spp. More than 72% (56/77) of the isolates were resistant to Fluoroquinolone. Residual antimicrobials (norfloxacin, ciprofloxacin, and enrofloxacin) were detected in the majority of the samples. Our findings will contribute to expanding the knowledge of the factors that can favor controlling antibiotic resistance in *Campylobacter* species.

Keywords: *Campylobacter*, Zoonosis, Antimicrobial resistance, Quinolones.

Brick Kiln Environment: Source of Vector Borne Zoonotic Diseases

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Brick manufacturing is considered as a growing industry in many countries like Pakistan, China, India, Nepal and Bangladesh. Brick kiln sector is also known as potential source of air pollution along with vehicles and resuspended road dust. Traditional brick making releases harmful gases in the atmosphere, altering the vegetation and affecting soil quality. Through its emission of CO2, SO2 and tropospheric ozone (O3) brick kilns also impact on the weather patterns and affecting the rainfall, humidity level, which may increase the destructiveness of tropical cyclone and lead to global warming. This climatic change is providing suitable conditions for growth of vectors. Besides these environmental changes the crack and cervices, mud floor, stagnant water sources present on brick kiln are the harbor sites of many vectors e.g. ticks, mosquitoes, fleas, bats which are the potent source of transmission of certain zoonotic diseases from brick kiln animals (horses, mules, donkeys) to humans. Horses act as reservoir or host for these vectors and transmit pathogens to the humans through direct contact or contact with their droppings. Lyme disease equine granulocytic ehrlichiosis (EGE) and human granulocytic ehrlichiosis (HGE), Dengue, Equine encephalomyelitis, Hendra virus are some of the zoonotic diseases present on brick kiln. Regarding one health point of view a proper surveillance should be done on brick kiln to screen the abundance of these pathogens so that we can access their prevalence and devised some control measures to minimize the chances of zoonotic transmission.

Keywords: Brick kiln, Vectors, One health, Global warming, Horses

Immunomodulatory Activity of *Artemisia brevifolia* Extract Again Mixed *Eimeria* Infection in Chicken

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This study was designed to assess the immunomodulatory activity of aqueous methanolic extract (AME) of *Artemisia brevifolia* (Leaves) against mixed *Eimeria* species infection in broiler chickens. 175 day old broiler chicks were selected for this study and equally divided in five groups (A, B, C, D and E). Each group contains 35 chicks. Extract of selected plant was given orally with dose rate of (100, 200 and 300 mg/kg of body weight respectively) at 7^{th} ,8^{th} and 9^{th} day of age. Group D served as positive control (Vitamin E treated) and Group E served as negative control (PBS treated). *Eimeria* infection was given to the birds at the age of 14^{th} day. Cell mediated immunity was evaluated by 4 tests (Phytohemagglutinin-P, Concanavalin-A, Carbon clearance assay and Dinitrochlorobenzene). Humoral immunity was evaluated by microplate hemagglutination test using sheep red blood cells. Results showed dose dependent immune response of *A. brevifolia* ABE in treated groups. *A. brevifolia* ABE @ 300 mg/kg of body weight shown best results which was almost similar ($P>0.05$) to positive control group (Vitamin E treated) but significantly higher ($P<0.05$) negative control (PBS treated).

Key words: Coccidiosis*; Artemisia brevifolia* Extract; *Eimeria*; Immunity; Chicken

Synergistic Antiulcer Activity of Methanolic Extract of a Mixture of *Cinnamon cassia* Bark and *Annona squamosa* Twigs in Indomethacin-Induced Ulcer

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Cinnamon cassia bark and Annona squamosa twigs have been individually described to possess antiulcer activity. In an effort to develop a pharmaceutical product with gastroprotective potential, the synergistic antiulcer effect of methanolic extract of a mixture of C. cassia bark and A. squamosa twigs at 50:50 ratios was assessed in experimental animals. Antiulcer activity of methanolic extracts of C. cassia (MECC) bark and A. squamosa twigs was studied in rats, in which gastric ulcers were induced by indomethacin (20 mg/kg, orally) followed by pylorus ligation method. The methanolic extract of A. squamosa twigs (MEAS) (100 mg/kg); MECC bark (100 mg/kg); mixture of a (MEAS) twigs and MECC bark (50 mg/kg:50 mg/kg, respectively) was administered orally to the rats for 6 consecutive days followed by pylorus ligations of a stomach on the 7th day of experiment. After 4 h of ligation, the animals were subjected for evaluation of ulcer index and gastric acid content. The reduction of ulcer index and gastric acid content in mixture of a MEAS and MECC-treated animals was seen to be statistically significant with respect to control group of rats. The mixture of a MEAS and MECC exhibited better ulcer protection effect as compared to individual effect of MEAS and MECC. Misoprostol was used as a standard drug for ulcer protection.

Key words: Annona squamosa, Antiulcer, Cinnamon cassia, Indomethacin, Pylorus Ligatio

Environmental Parasitology: Bio-indicator for Aquatic Ecosystems

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There are complex interactions between parasites, hosts and environment which are influenced by stability of ecosystem. The environmental parasitology basically deals with the interaction between parasites, pollutants and the environment. The sensitivity to the pollutants and environmental changes make many parasite taxa as useful bioindicators of environment and anthropogenic impact on aquatic animals like fish. As some organisms are sensitive to pollutants in their environment they change their morphology, physiology, behavior and may die and environmental degradation can be assessed.Anthobothrium, Paraorigmatobothrium are the parasities (Cestodes)in Shark (*Carcharhinus dussumieri*) which act as bioindicator to heavy metal accumulation in fresh water or marine bodies. Heavy metals like cadmium have impact on fish and parasite population. Analyzed by inductively coupled plasma technique, the concentrations were higher in parasite tissues than its host tissues. So they protect the host by lowering the heavy metal concentrations. These parasites are beneficial as early warning bioindicators.

Keywords: Bio indicators, Anthropogenic, Ecosystem, Sensitivity

Association of HLA DRB1*15 Allele with the Risk of HBV Infection in Pakistani Population

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Hepatitis B virus infection is one of the leading cause of morbidity and mortality affecting millions of people worldwide. Common factors attributed to HBV infection are viral, immunological, host genetic and environmental factors. The human leukocyte antigen system is one of the most important host factors that are correlated with the clinical progression of HBV infection. HLA class II glycoproteins present viral peptides to CD4+ T cells and affect the immune responses. The present study was aimed to find the association of HLA DRB1*15 allele with risk of hepatitis B virus infection among Pakistani population. The blood samples of 46 HBV patients and 38 healthy controls were collected. Exon 2 of HLA DRB1 gene was amplified with polymerase chain reaction using allele specific primers. The amplified products were then sequenced and the chromatograms obtained were compared with reference sequences in NCBI by using Bio edit software. Two single nucleotide polymorphisms (rs17885908 and rs17885482) in HLA DRB1*15 allele were observed by the analysis of sequenced data. All the observed genotypes of the patients and control for the polymorphism were in Hardy-Weinberg Equilibrium. For SNP rs17885908 of HLA DRB1*15 allele, the frequency of the heterozygous genotype (CT) was greater in patients than controls 57% and 28% respectively with a significant difference of p =0.013, OR =3.41 and 95%CI = 1.25-9.29. For SNP rs17885482 HLA DRB1*15 where single nucleotide change T>C at Chr6:32552020, the frequency of the homozygous genotype (GG) was greater in patients than controls 46% and 18% respectively with a significant difference of p<0.001, OR =3.83 and 95%CI =1.23-11.92. The findings of the study showed that variant C of the SNP rs17885908 with amino acid substitution of Val79Ala and variant G of the SNP rs17885492 with amino acid substitution of Val115Gly of HLA DRB1*15 allele are considered to be associated with protection against hepatitis B virus infection among the studied population.

Keywords: Hepatitis B virus, HLA DRB1 gene, DRB1 15 allele, Single Nucleotide Polymorphism

Prevalence of Rabies Cases in Livestock & Eliminating Rabies by Public-Veterinarian Partnership

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Rabies also known as hydrophobia is an acute, highly fatal disease of CNS caused by lyssavirus type 1. It is a zoonotic disease, most commonly spread by saliva of infected animal (dogs are the main vector in Pakistan). The incidence of rabies virus infection per year in the world is estimated as 3.3 billion to 3.6 billion with approximately 59,000 deaths mainly in Asia and Africa. Rabies is a neglected disease in Pakistan affecting humans, pets and livestock. . The neglected disease is brought into attention by number of events and eradication programs. Save Pakistan from Rabies (SPR) Team , a volunteer society equipped with trained veterinarians, evaluate the prevalence of rabies in livestock with the help of questionnaire survey considering the factors like behavior of owners toward animal rabies, management of dog bite wound in animals, diagnosis of disease, vaccination and its effectiveness. our team arranged number of seminars and awareness campaigns and we leave no stone unturned collaborating to promote partnership between public and trained rabies educated veterinarians to eradicate rabies, as reservoir of disease are mammals and veterinarians have primary role in eliminating disease. We noticed that there was a huge knowledge difference at the start and the end of campaign about management of rabies cases in livestock and the mutual understanding between public and veterinarians. Our team also translated the GARC courses into Urdu for the convenience of people and we are also taking volunteers from different other colleges and universities to work with us and join hands to fight against rabies in Pakistan by eradication of wrong practices like use of chili, garlic and bite wound suturing practices.

Keywords: Rabies, Elimination, Veterinarians

A Cross-Sectional Survey of Brucellosis in Small Ruminants of District Jhang, Punjab, Pakistan

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Brucellosis is a bacterial zoonotic disease having wide host range and global zoonotic importance. It has great public health importance in most of the countries, where livestock is a major source of food and income. High risk individuals include animal handlers that are on a great risk of getting infection because bacterial transmission occurs from all body fluids from an infected animal. A randomized cross sectional survey was conducted to check the period prevalence of brucellosis in small ruminants in different areas of district Jhang. Serum samples were collected along with questionnaire for this purpose. Different risk factors like age, sex, specie, feeding protocol, abortion history, type of herd, herd size, location were observed using questionnaire. A total of 280 serum samples (136 caprine and 144 ovine) were collected and subjected to Rose Bengal precipitation test for screening of brucellosis. Over all Prevalence was 5.5% after confirmation with Indirect ELISA. 21 samples out of 280 were positive after RBPT screening and 14 out of 21 were confirmed positive for brucellosis by indirect ELISA. According to p value after statistical analysis all the risk factors except feeding protocols, abortion and age in case of sheep had no significant results. According to odd ratio all the selected risk factors have association with disease prevalence. In Female (6.25%) there is more sero-positivity than male (1.39%). Sheep (8.09%) had more sero-positivity than goats (2.08%). Out of four Tehsils Jhang (14.81%) had more sero-positivity. Out of three age groups (<2 years, 3-4 years and >5 years) >5 years (6.78%) animals had more sero-positivity than <2 years (4.54%) and 3-4 years (4.51%). Herd size >50 animals (10.94%) had more sero-positivity than ≤10 (3.17%), 10-30 (1.61%) and 30-50 (10.34%).Mix animal species within herd had more chance of sero-positivity than pure herd. Grazing practice for feeding of animals (7.02%) had more sero-positivity than stall feeding (1.83%). Brucellosis was endemic in the study design area which is a great risk not only for animal's population but also for humans.

Keywords: Brucellosis; zoonotic, Rose Bengal precipitation test, Chi square.

Quantitative Parasitological Parameters to Analyze the Helminthic Infection in Francolins (Galliformes: Phasianidae) with a new Species of *Acanthocephalan* from Pakistan.

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Francolins are among the very amiable variety of game birds which are severely infected by various types of parasites that may cause an important source for infection transmission in human by eating them. During this study, two commonly found francolins species of the region; *Francolinus francolinus* (Black Francolin) and *F. pondicerianus* (Grey Francolin) were examined for helminthes infection in Sindh, Pakistan. During the present study, the gut content and forage of total 20 birds were examined, out of which 17 were found infected with Cestode larvae of two species of genus *Cotugnia* and genus *Raillietina*, one species of trematode, *Prosthogonimus cuneatus* (Rudolphi, 1809); one species of acanthocephalan, *Mediorhynchus francolinae* sp. nov. and one species of nematode, *Subulura brumpti* (López-Neyra, 1922) were recovered. This is the pioneer study of the helminthological and quantitative parasitological aspect of francolins, with new host records. The forage content and comparative incidence of helminth species is also observed and discussed in the current study, which revealed the high prevalence of infection in grey francolins (100%) than that of black francolin (70%). The mean intensity of infection relative to the forage in guts of hosts (mean±SE) was also observed 9.14±1.53, which is significant in black francolins ($p<0.05$) than grey francolins (5.8±0.48). The highest frequency of nematodes and cestodes was recorded in black francolin; however the comparative statistical analyses was also carried out for the infection of helminthes in both species of francolins using the Fisher's Exact Test (F<=f).

Keywords: Helminthes, *Francolinus*, New species, Fisher's Exact test, Forage-parasite interaction, Pakistan.

Impact of Feeding Mannan-Oligosaccharide and Live Yeast on Performance, Ruminal Histology and Muscle Morphometric Characteristics in Buffalo Calves

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The objective of current study was to assess the effect of dietary supplementations of mannan-oligosaccharide, live yeast, and combination of these two additives on growth performance, histo-morphology of rumen, and muscle morphometric attributes in buffalo calves. A total of twenty buffalo calves (average weight of 25 ± 3kg) having 3 months of age were distributed according to a complete randomized design. All animals were individually stalled in the shed and were fed ad-libitum. Experimental animals were divided into four groups for a period of 67 days: Control group (without inclusion of dietary supplementation); MOS group (Mannan oligosaccharide 5 g/clave/day; Yeast group (Live yeast 2g/calve/day) and Mixed group (MOS + Live Yeast 2.5g + 1g)/calve/day. Experimental results reveled that combined supplementation of MOS and Yeast and MOS alone resulted in increased number of short chain fatty acids in rumen as well as ruminal pH ($P<0.05$). Results showed the significant improvement in average daily gain and FCR of MOS and Mixed supplemented groups ($P<0.05$). Histomorphological evaluation of ruminal epithelium showed the significant improvement in mixed supplemented group ($P<0.05$) as compared to yeast and control group by reducing the epithelium thickness. Muscle quality was checked with the help of texture analyzer and results showed the significant improvement in muscle quality of Mixed and MOS supplemented groups. Histological examination of longissimus dorsi muscle cross-section showed a significant improvement in the muscle fiber diameter and muscle fascicle diameter of mixed and MOS supplemented calves groups. In conclusion supplementation of MOS, Live yeast and their combination improved the growth performance, ruminal histomorphology, muscle morphometric characteristics in experimental calves.

Keywords: Buffalo Calves; Prebiotic; Rumen Histology; Muscle Micro-Architecture; Growth Performance.

Mutation Screening of VSX1 and SPARC Genes Involved in Keratoconus

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Keratoconus (KC) is corneal ectatic disease, characterized by non-inflammatory, paraxial stromal thinning of the cornea. It is a multifactorial disorder caused by variable genetics and ecological factors. Disease complexity has made its underlying mechanism far from complete. Apart from various methodologies, candidate gene approach is being widely adopted to study multi-factorial complex diseases that allows researcher to identify even small gene effects in large cohort size. Henceforth, this present current study is aimed to identify the pathogenic mutations in VSX1 (visual system homeobox 1) and SPARC (secreted protein acidic and rich in cysteine) genes among sixty keratoconus patients in Pakistan population. The results of this study presented two different intronic-mutations in exon 4 of VSX1 gene i.e. g.4435- 4436TC/- at chr20:25058561-25058562 and chr20:250585. Whereas, SPARC gene presented varied intronic variants in exon 9 and 10. Exon 9 revealed replacement of C/T at chr5:151043868, and deletion of C (g.23188C/.) at chr5:151043539. However, exon 10 of SPARC gene revealed deletion of A (g.23510A/-.) at chr5:151043217. Therefore, based on this study, it is proposed that these mutations may affect the splice sites through varied alterations as predicted through mutation taster and affect translation of normal proteins. Though further inslico analysis are required to predict the exact pathogenetic role of these intronic mutations that may provide new avenues for precise molecular diagnostics and genetic studies.

Keywords: Keratoconus, Cornea, mutations, VSX1, SPARC *Mutation, Keratoconus* 2

Biodiversity of Ticks Associated with Cattle in Gujrat, Punjab, Pakistan

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The aim of the study was to discover the species of ticks associated with cattle in Gujrat, Pakistan. The specimens were collected from the body of cattle by using forceps and after that the collected specimens were killed with the help of cyanide killing jar. The collected samples were transferred to specific bottles containing 70% alcohol for preservation of the samples. After that, these samples were boiled in 15% solution of potassium hydroxide for 10 to 15 minutes under spirit lamp for clearance. After this treatment, the samples were transferred to alcohol solution and then washed with the help of tap water to remove alcohol from the body of specimens. The samples were identified with the help of authentic morphological keys and after confirmation they were kept in insect box in the Department of Zoology, laboratory. During this study, about 524 specimens were collected from the sites. In these four species were identified that belong to three genera and one family. The maximum number of species collected from the area was *Boophilus annulatus* (33.02%), whereas *Rhipicephalus sanguineus* was low in number (11.83%). This might be due to the availability of host and species preferences. The activity and number of ticks is also affected by the temperature of the area. In future, the study about the control of identified and reported species and systematic of unidentified species in the present research through molecular biology techniques is suggested.

Keywords: *Boophilus, Rhipicephalus*, Ticks, Gujrat,

One Health Approach in Case of Covid-19

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Covid-19 can put under specific control by using one health technique. According to this technique, the human beings, animals, plants and environment are connected to each other by a specific linkage. In this way these are considered as one health. Covid-19 can be controlled by using one health technique in a particular way. This infectious disease is called as an arousal call to the people of our community to male rules and regulations according to which we can control the spread of other such diseases. To control such an infectious disease like covid-19 in human beings, we must have to control the causative agent of that disease in animals. There is a direct or may be indirect relation between the whole ecosystems. It is already proved that there are some of the medicine by which the human beings are thought to be resistant but in veterinary these medicines are still effective. This thing influences us to control the disease firstly in animals so that the spillover will also be controlled from animals to human beings. If spillover is controlled than approximately half of the infection is supposed to be gone away. Covid-19 is giving the best example for spillover of infection from bats to humans. Human beings and livestock should never work in close vicinity without following standard precautionary measures. A proper balance must be maintained to keep the environment in well-organized way. All the factors which are effecting plants, animals or environment should be examined in detail.

Keywords: Covid-19, Spillover, One health & Infection.

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It is broadly perceived that control and elimination of zoonotic diseases need a joint methodology from both the animal and human sector. A joint surveillance framework utilizing the One Health approach is the best and productive method of shielding populations of humans and animals from zoonotic diseases in low-income nations. However, usage of such a surveillance approach in these nations is hampered by a few factors: various disease challenges, unmotivated One Health labor force, distance, absence of appropriate working instruments, and low financial plan. These variables frequently prompted the rise and spread of zoonotic infections like rabies and *Bacillus anthracis* as these nations are home to those zoonotic sicknesses. The main focus is to create an environment that allows partner institutions to generate and share knowledge to better control neglected zoonotic disease. This will help us to better characterize and control neglected zoonotic diseases in Pakistan.

Keywords: *Bacillus anthracis,* Zoonotic diseases

Localization of Androgen Receptors in Male Rats Treated with *Mucuna Pruriens* Seeds Methanolic Extract using Immunohistochemistry

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Androgens play key role in maintaining the normal spermatogenesis exert their effects on tissue through androgen receptors (AR). It is necessary to determine the cellular distribution of AR in testicular tissue to understand the mode of AR action in testis. This study investigated the AR distribution in rats' testicular tissue using immunohistochemical approach. Adult male rats were divided into six groups of five animals in each group (n=5) as control, toxic and testosterone group, and three test groups administered with different doses of plant extract for six weeks. Body, testis and relative testis weight of rats were recorded. Variations in histomorphology of rat testicular tissue were observed through H & E staining. AR immunostaining was detected in the nucleus or cytoplasm of cells in rat testis after microwave antigen retrieval through immunohistochemical staining. Variation in body and relative testis weight of test group rats compared to control rats were observed. The protective effect of *M. pruriens* seeds methanolic extract against CCl_4 intoxication was observed on testicular histology. Immunohistochemistry revealed significant immunostaining of AR in the cytoplasm or nucleus cells in testicular tissue of test group rats. The study concluded that M. pruriens seeds extract has androgenic potential leading to the increased AR immunostaining in testicular cells and might enhance male fertility.

Keywords: Immunostaining, Androgens, *Mucuna pruriens*

Evidence of Antimicrobial Use and Antimicrobial Resistance in the Food Animals: Lesson Learned in Pakistan

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There is a paucity of national as well as farm level data on the quantities of antimicrobial use and resistance among food animals in low-and middle-income countries including Pakistan. To address this, we investigated antimicrobial use (AMU) and antimicrobial resistance (AMR) at 10 commercial broiler farms for a year in Pakistan. Since, colistin is frequently used in poultry, we also determined colistin resistance and molecular basis using whole genome sequencing approaches. We determined the AMU for therapeutic or prophylactic and as feed-additive among 60 flocks from a 10 commercial broiler chickens production units. The amount of antimicrobials administered by the farmer for therapeutic or prophylactic purposes was calculated in mg/kg of final flock weight. In addition, screening of *E. coli* with mobile colistin resistance gene *mcr-1* was also determined from broilers in farms. Annual on-farm AMU was 260 mg/kg of active Ingredient. Colistin was the most frequently used antimicrobial for therapeutic purpose (100%) followed by enrofloxacin (98%) and doxycycline (90%). The top three antimicrobials used for therapeutic or prophylactic purposes measured by mg/kg of final flock weight were doxycycline (90 mg/kg), colistin (42 mg/kg) and tylosin (30 mg/kg). Of 300 broiler birds screened for colistin resistance, 70 (23%) carried carried *mcr-1* genes whereas *mcr-2* and other variants were not detected. Most of the isolates also carried the genes encoding resistance against beta-lactams (blaCTX-M-15 or blaCTX-M-14) (62/70), aminoglycosides strA and strB (60/70), tetracycline (tetA, tetB) (55/70) and 40/70 qnrS1. Horizontal gene transfer of related plasmid (IncI2) seems to be involved in spread of *mcr-1* gene which lacks ISApI1 transposable element. Whole genome based MLST showed ST117 and ST2847 as dominant STs among *mcr-1* positive *E. coli*. Significant correlations between colistin resistance and usage were detected. Our study showed excessive usage of critically important antimicrobials including colistin at farm level. Overall, average yearly consumption of antimicrobials was 250 mg/kg of final flock weight. Furthermore, this study also showed a high prevalence of plasmid-mediated colistin resistance *mcr-1* gene and its correlation with colistin use at farm level. Our findings stress the urgent need to reduce the use of critically important antimicrobials in poultry sector in Pakistan and countries with comparable farming practices to prevent a public health crisis.

Keywords: Antimicrobial Resistance, Food Animals, Whole Genome Sequencing, Colistin-resistance

High Prevalence of *Echinococcus granulosus* in Dogs in Pakistan – Huge Risk for Human and Livestock Population

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Echinococcus granulosus (Eg) infection is a neglected tropical disease of humans and livestock causing serious economic losses. Dogs as the definitive hosts are responsible for contaminating the environment through feces containing eggs. Fecal samples of a total of 384 dogs were tested through copro-antigenic ELISA for the detection of *Echinococcus granulosus* antigen. The highest prevalence was found in Lahore (9.80%) followed by Islamabad/Rawalpindi and Faisalabad with an overall prevalence of 6.79%. Prevalence was higher in females, young dogs (≤3 years), stray/feral dogs, dogs fed with raw offal and dogs with Body Condition Score (BCS) of 1-3. Statistically significant association ($p<0.05$) was found between copro-positivity and different variables investigated except for sex ($p>0.05$). Significant statistical differences (Binary logistic regression) were observed for age, companionship and feed type. Since dogs are responsible for contaminating the environment, the *Echinococcus granulosus* prevalence in this study indicates a potential risk for human and livestock populations in the study areas and suggests a proactive approach in cystic echinococcosis management.

Keywords: *Echinococcus granulosus*, One-Health, Prevalence, Copro-ELISA, Dogs, Pakistan

Serodiagnosis of Toxoplasma gondii in Domesticated Cats and its Associated Risk Factors in district Jhang, Pakistan

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Toxoplasmosis, an important zoonotic parasitic disease-causing infection in humans and contaminating the environment. Cats are the sole source of spreading infection. Current study was designed to serodiagnoses in the flooded area, Jhang, Pakistan. Using rapid identification pen side strip test 316 pet cats were examined at CVAS, Jhang and other private clinics in that area. Rapid ID Chromatographic immune assay was performed to detect the antibodies for Feline toxoplasma IgM and IgG in serum. Related associated risk factors like breed, sex, contact with other livestock animals, deworming, location type (urban or rural area), diet (nature of food either cooked or uncooked meat), and outdoor access for wandering were also interviewed by owner. Total seroprevalence of cats was 10.4% (33/316). IgG antibodies were found 9.09 (29/316) while IgM antibodies were 2.21% (7/316) in cats. Seroprevalence was significantly high in cats older than one year. No significant difference was recorded between males and females. Cats from peri urban areas showed higher prevalence. Cats having access to outside, contact with other animals and eating uncooked food showed high seroprevalence. The current study confirms that Toxoplasma gondii is widespread in pet animals in district Jhang, Pakistan.

Keywords: Toxoplasmosis, Seroprevalence, Chromatographic, Contaminating, Immune assay, Outdoor access.

Antioxidant and Anticancer Potential of Tannins from Callus Cultures of *Achyranthes aspera* L.

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Oxidative stress, initiated by free radicals generated during metabolism, is the cause of many diseases. The free radicals contribute to change in the structure and function of proteins and nucleic acids leading to cardiovascular disorders, atherosclerosis, cancer, etc. In the present study, the antioxidant and anticancer potential of tannins content of callus cultures from different explants of *A. aspera* was evaluated. The tannin content in chloroform extract of leaf callus culture was high among callus cultures and was comparable to tannin content displayed by petroleum ether extract of seedling leaf tissue of *A. aspera.* Tannins from the leaf callus extract of *A. aspera* exhibited considerably significant antioxidant and anticancer activity against the Jurket cell line in form of cell viability. We can conclude that *in vitro* biomass production can substitute the plant material for the production of phytochemicals like tannins from *A. aspera* and other plants having medicinal importance. Tannins from callus cultures of *A. aspera* might be useful for the development of anticancer drug.

Keywords: Callus culture, Plant growth regulators, Tannin content, Scavenging activity, Anticancer activity

Knowledge, attitude, and practices of veterinary professionals about rabies management and control in Pakistan in the One Health context

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For the management and control of human rabies deaths, veterinary professionals' contribution is needed. The effectiveness of the One Health approach would depend on the level of awareness about the strategies of rabies control among veterinary professionals. We aimed to assess veterinary professionals about rabies control strategies from August 2019 to September 2020 in Pakistan. A total of 375 practicing veterinary professionals having different levels of educational background with at least a degree of Doctor of Veterinary Medicine (DVM) from four provinces of Pakistan were included in this study through face to face interview. Of the surveyed veterinarians 56.3 % (n = 211) stated their exposure to a dog-bite at least once. About 51.2% (n=192) of practicing veterinarians were not vaccinated against rabies and 18.1% (n=68) stated that the rabies vaccine was not available even for them. Furthermore, 38.1% (n=143) never took part in a rabies awareness program for their community. Almost 43.2% (n=43.2) usually did not recommend pet owners about the vaccination against rabies for their dogs. Lack of awareness about the epidemiology of rabies in their area was significantly associated with not paying attention to the vaccination status of dogs about rabies during other treatments (p=0.013). The implementation of One Health approaches, such as vaccination of dogs for the prevention of human rabies is highly recommended. The study highlighted many deficiencies and hurdles in the awareness and attitude of veterinarians in Pakistan. To remove these deficiencies, veterinarians should get training on rabies and incorporation of trained veterinarians on dog-bite case management. Through the implementation of such strategies, we will not only reduce the demand for rabies human vaccines which are already short in supply in developing countries but also play a role in reaching zero by 30 the global strategic plan to end human deaths from dog-mediated rabies by 2030.

Keywords: Rabies, Veterinary Professionals, One Health, Pakistan, Dog-bite

Bacillus subtilis probiotics: A potential candidate to curtail ammonia emissions in poultry sheds

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Ammonia is one of the major environmental pollutant causing serious problems for the animal and human welfare. This gas causes respiratory destress and may lead to heavy mortality in commercial chickens. To meet the consumer requirements of protein, the poultry sector in the developing countries like Pakistan is growing with a rapid pace. The increasing intensive farming is thus creating problems in the health sector and ecosystem. By this mean, the waste production is increasing very rapidly which may fortify the environmental implications. Many technologically advanced countries have shifted from using dietary antimicrobial chemicals to the application of safe alternate sources for poultry production. *Bacillus* subtilis is one of the renowned safe probiotic candidates to be used in animal industry. Such probiotics have been reported to contribute in growth promotion, amending the gut microstructure and physiology, and developing the immune system in the broilers. The *Bacillus* is able to colonize in the luminal surface of the gut mucosa by competing with other luminal pathogens and protecting the lining epithelium from injury. This engineered friendly bacteria thereby impart double benefits i.e., boosting digestion of important nutrients in the feed, and performing competitive exclusion of the pathogens. The fewer nutrients leftovers in the waste form absorption have economic impact on poultry production and cause minimizing the growth of pathogenic bacteria. Probiotic bacteria have recently been reported in minimizing ammonia production in indigestible poultry wastes. The information in the literature to fill the gap that the ammonia emissions from the broiler excreta is reduced by using *Bacillus* type probiotics is still needs to be explored in depth and is the emerging idea for discussion.

Keywords: Probiotics, Broilers, Ammonia gas, Environment, Health

Evaluation of antibacterial effects of *Azadirachta indica* (Neem) extracts against MDR *Acinetobacter baumannii*

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Acinetobacter baumannii is considered as one of the most emerging nosocomial pathogens causing high mortality. The following study deals with the determination of antibacterial activity of *Azadirachata indica* extracts against clinical isolates of *A. baumannii*. The identified and confirmed multidrug resistant strains of *A. baumannii* were collected from Department of Microbiology, Government College University, Faisalabad. Collection of Neem plant was done from the Botanical garden of Government College University, Faisalabad. Four different organic plant extract such as Chloroform, Ethanol, Methanol, n-Hexane respectively were prepared through simple extraction method. The isolates were analyzed for antimicrobial susceptibility testing to various concentrations of *Azadirachata indica* aqueous and organic extracts using agar well diffusion method. Chloroform extract showed highest inhibitory zone of 15mm followed by Methanol extract showed a clear zone of 13mm, n-Hexane extract showed a zone of 12mm and 11mm zone of inhibition shown by the Ethanol based extract. However, minimal inhibitory concentration (MIC) of chloroform extract is 2.5 mg followed by 5mg for methanolic and n-hexane extract and 10mg for ethanolic extract. In case of minimal bactericidal concentrations (MBC) all the four plants extracts having bactericidal property. Then synergistic effect of plant extracts and antibiotics against selected organism was determined using fraction inhibitory concentration (FIC) method specifically 2D checkerboard broth dilution method. FIC index showed that all the plant extracts have potent synergistic effect with both antibiotics (ceftriaxone & kanamycin). The highest clear zone of 15mm was observed in 5 mg of chloroform extract with 2 mg of ceftrizone and 13 mm clear zone of inhibition was recorded in 5mg of chloroform with 2mg of kanamycin. Therefore, the application of these plants extracts may be potential alternative approach against MDR *A. baumannii* and their effect was enhanced when used in combination with antibiotics.

Keywords: MDR, MIC, *Azadirachata indica*

Localization of androgen receptors in male rats treated with *Mucuna pruriens* seeds methanolic extract using Immunohistochemistry

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Androgens play key role in maintaining the normal spermatogenesis exert their effects on tissue through androgen receptors (AR). It is necessary to determine the cellular distribution of AR in testicular tissue to understand the mode of AR action in testis. This study investigated the AR distribution in rats' testicular tissue using immunohistochemical approach. Adult male rats were divided into six groups of five animals in each group (n=5) as control, toxic and testosterone group, and three test groups administered with different doses of plant extract for six weeks. Body, testis and relative testis weight of rats were recorded. Variations in histomorphology of rats testicular tissue were observed through H & E staining. AR immunostaining was detected in the nucleus or cytoplasm of cells in rat testis after microwave antigen retrieval through immunohistochemical staining. Variation in body and relative testis weight of test group rats compared to control rats were observed. The protective effect of *M. pruriens* seeds methanolic extract against CCl_4 intoxication was observed on testicular histology. Immunohistochemistry revealed significant immunostaining of AR in the cytoplasm or nucleus cells in testicular tissue of test group rats. The study concluded that M. pruriens seeds extract has androgenic potential leading to the increased AR immunostaining in testicular cells and might enhance male fertility.

Keywords: Immunostaining, Androgens, *Mucuna pruriens*

Green synthesis of silver nanoparticles from moringa oleifera and their antibacterial activity against different pathogenic microbes

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Synthesis of silver nanoparticles utilizing biological synthesis approaches such as, *Moringa oleifera* leaves extract is becoming much more important in the field of medical science. Among different metallic nanoparticles silver has good antibacterial potential and now a days gaining attention as novel treatment options against pathogenic microbes. Optimized conditions including 20ml *Moringa oleifera* leaves extract and 80 ml aqueous solution of 3mM $AgNO_3$ was applied for synthesis of silver nanoparticles. Characterization techniques were used to confirm the nano-formation of the synthesized material. UV-Visible spectrophotometer was used as a primary tool for confirmed synthesis of AgNPs by showing a sharp peak at ~480 nm, XRD analysis confirmed the crystalline form of our sample and average grain size was determined as 25.99 nm, FTIR analysis revealed the presence of biomolecules in plant extract. SEM imaging showed that our particles are spherical in shape and the average size of particles was found to be 82.6nm. EDX spectrum confirmed the purity of our synthesized NPs. TGA/DSC analysis confirmed that our nanoparticles have good thermal stability. Antimicrobial potential of synthesized silver nanoparticles (AgNPs) was assayed by agar well diffusion against MDR strains of *Acinetobacter baumannii* and *Pseudomonas aeruginosa* and showed that these resistant microbes are sensitive to nanoparticles. MIC and MBC assay was also employed to check the antibacterial potential of these nanoparticles. Combined effect of AgNPs with antibiotics was determined by two-dimensional checkerboard assay as well as by agar well diffusion assay. Results showed that AgNPs have a strong synergistic effect when applied in combination with drug.

Keywords: Resistance, Nano-particals, Microbes, MIC

Detection of seeding activity in preclinical blood samples from BSE-infected sheep using protein misfolding cyclic amplification (PMCA)

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Variant Creutzfeldt-Jakob disease (vCJD) is a human prion disease resulting from zoonotic transmission of bovine spongiform encephalopathy (BSE) and its transmission by blood transfusion necessitate is a major public health concern, as individuals infected with prions can remain healthy for years before developing signs/symptoms of brain disease. Development of a highly sensitive, non-invasive and inexpensive prion detection assay at preclinical stage is an important goal to minimize further spreading of vCJD. We have used sheep experimentally infected with BSE as a model to study the risks of transmission of prion diseases by transfusion of blood components that are commonly used in humans and collected a large archive of blood samples from animals at different stages of infection. Our aim is to determine the sensitivity of detection by PMCA of seeding activity in preclinical blood samples, and understand the relationship between the level of seeding activity and transmission of infection by blood transfusion. We used a 96-well microplate-based, miniaturized bead serial PMCA protocol[1-2] with brain homogenate from tgShpXI transgenic mice expressing sheep ARQ PrP as substrate with added dextran sulphate. Reactions were seeded with tenfold serial dilutions of BSE-infected sheep brain homogenate (positive control), buffy coat samples from BSE-infected sheep undiluted or diluted 1:1 in PMCA buffer, and corresponding blood samples from uninfected sheep (negative controls). We were able to detect PrP^{Sc} in reactions seeded with a 10^{-8} to 10^{-10} dilution of BSE-infected sheep brain homogenate after 2 rounds of serial PMCA, and in blood samples from sheep showing clinical signs of BSE. In the transfusion experiments, blood was collected from sheep orally infected with BSE at 10 months post-infection, at least 8 months before they developed clinical signs, and used to prepare components (e.g. red cells, plasma) for transfusion to recipient sheep. Positive amplification was identified in PMCA reactions seeded with buffy coat samples collected at this time point, with a higher proportion of positive results in samples from donor sheep that transmitted infection to one or more recipients. PMCA testing of buffy coat samples collected from individual sheep at different stages throughout infection have demonstrated positive amplification from 6 months post infection onwards in some animals. No non-specific amplification was detected in negative control samples after up to 8 rounds of serial PMCA. We have confirmed that the microplate-based serial PMCA method demonstrates relatively sensitive and specific detection of infection in preclinical blood samples collected from BSE-infected sheep from at least 4 months post-infection. Our preliminary data suggests that levels of seeding activity are higher in blood samples from sheep that transmitted infection by transfusion, potentially indicating a positive correlation between the amount of misfolded PrP and infectivity titres in blood.

Keywords: BSE, vCJD, Transmission, PCR

Impact of climate change on drug residues

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Climate change typically characterized by increased environmental temperature, humidity, rainfall and floods; enhances the survival, growth, distribution, and reproduction rate of pathogenic micro-organisms, vectors, as well as parasites and their intermediate hosts. The ensuing high prevalence of vector-borne microbial infections and parasitic infestations requires increased drug administration in affected humans, animals and plants. As a result, significantly greater residual concentrations of drugs/metabolites are passed into the environment. Moreover, climate change also contributes to enhanced passage and retention of drugs/metabolites in the soil and water. Consequently, the prospects of resistance to antimicrobials and anthelmintics, and the detrimental effects of drugs/metabolites on ecosystem are substantially augmented. Finally, appropriate strategies for mitigating climate changes and enhancing the residue monitoring are recommended.

Key words: Climate change, Drug residues, Ecosystem

Chlamydia abortus as an infectious agent of abortion in small ruminants and a potential risk for pregnant women.

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Chlamydia abortus (C. abortus), formerly known as Chlamydia psittaci type-1, is a gram-negative obligate intracellular organism and is ranked amongst the major causes of infectious abortion in small ruminants. Exposure to the aborted material or contaminated secretions may introduce the infection to the naïve animals which may remain asymptomatic or only show mild valvular discharge in some cases. Infection in non-pregnant animals may become latent and upon pregnancy, the organism reaches the trophoblasts via blood circulation causing placentitis resulting in later-term abortion usually, however, early fetal loss may also occur. Previously, the complement fixation test was widely used for screening against C. abortus but due to its cross-reactivity, specific ELISA targeting out membrane protein A or polymorphic outer membrane protein has been developed for its diagnosis in the aborted animals. Moreover, PCR can also be used for its diagnosis. Inactivated as well as live vaccines are available which may help in controlling the disease.

Keywords: Chlamydia abortus, sheep, abortion, zoonosis

One Health, times of the Pandemics: Covid-19 finally encourages the integrative health paradigm.

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With the evolution of the pandemic at the international and national levels, beyond the medical sciences, many sectors have been challenged including the social and political sciences, but also the economic and political sectors. A set of responses that are clearly part of One Health's increasingly necessary approach to combat this pandemic and undoubtedly better prepare for the future.However, what has been largely forgotten, or neglected by ignorance, is the memory of the history of the pandemics that have swept the continents for centuries and for which humanity has always shown its resilience. We will look at some of these exemplary diseases and how, throughout history, multiple means have emerged that are now at the forefront of our defense and response to the COVID-19 epidemic.The emergence of Coronaviruses in the context of zoonotic risk is not a new fact. Several coronaviruses, of this numerous virus family, showed their potential for species spillover from their wild animal reservoir to infect humans with mild or severe clinical success. While the mechanisms of species spillover are now understood, the underlying fundamental factors of emergence remain specific to each viral species that infects specific hosts (reservoirs or intermediates) in their natural environment, with certain transmission dynamics (e.g., host physiopathology, climate, behaviours, etc.). Several examples will be presented. SARS2 has special characteristics with increased infectivity due to its tropism for the respiratory system and its transmission by respiratory droplets. An efficient transmission rarely unmatched by any other virus but the orthomyxovirus of influenza. The second characteristic of SARS2 resides in its limited but consistent, virulence, despite the potential for the Coronavirus spontaneous mutation, concerning its infectious power. However, its positive tropism for the respiratory system strongly increases the case-fatality rate in the frail (age) or weakened (concurrent disease) individuals. Finally, we will see what responses are at stake against COVID-19, including public health actions and the difficulties in applying them; the various diagnostic tools to be used as the pandemic evolves; the various treatments that are still being tested; the promise of vaccines obtained in unprecedented times of development, fragile vaccines that are already difficult to apply in mass vaccination campaigns even before they have been validated.

Keywords: SARS COV-2, Public health, Pandemics, transmission

Zoonosis Perspective of *Coxiella burnetti*: an emerging threat to humans

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Q fever, also known as the query fever or Coxiellosis, is caused by obligate intracellular, gram-negative bacteria, the Coxiella burnetti. It is highly zoonotic disease and the causative agent has been grouped as B class pathogen. The pathogen is resistant to many antibiotics, drought and high temperatures. It remains viable in the environment for a long time. All species of mammals can get this disease but small ruminants play a role of reservoir and lead to the spread of disease. The pathogen is shed into body fluids, i.e., reproductive secretions, urine, feces, and milk and infects the other hosts through consumption of contaminated air, food, water and milk. Human can acquire disease through direct contact with feces, urine and reproductive secretions of infected animals, consuming contaminated unpasteurized milk and dairy products, inhaling contaminated air and tick bites. The old people and pregnant women are more at risk to become victim of this disease, so, the people belonging to these groups should avoid direct contact with animals especially during birth period of animal. For diagnosis, CFT has been being used previously. Currently, indirect ELISA and PCR are being used. The treatment includes long term use of doxycycline. A killed vaccine has been developed to boost immunity in human against the pathogen. However, there is no vaccine to be used in animals. The disease can be prevented by testing positivity of the disease in pregnant animals routinely and by adopting preventive measures.

Keywords*:* Coxiella burnetti, transmission, zoonosis

Molecular Characterization of ESBLs genes among Multidrug-resistant Gram-negative bacteria from Operation theatres and ICUs of different hospitals

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Operation Theatre (OT) and other sensitive units like ICU's. OT and ICUs are considered pivotal parts of the working hospital because major surgical procedures are carried out in it and the hospital's contaminated environment plays a crucial role in the transmission of HAIs. Therefore, the goal of the present study was to find the microbial load and characterize the inherent strains of ESBL producing Gram-negative bacteria and also evaluate the prevalence of *bla*CTX-MU, *bla*SHV, blaOXA-23, and *bl*aTEM genes among bacterial pathogens in different sections of DHQ hospital of district Bhakkar. In total, 200 environmental samples were taken and phenotypically identified by performing different biochemical methods. Drug-susceptibility testing was performed. PCR assay was used to confirm the MDR isolates, by using specifically designed primers after DNA extraction. ESBL production was screened by a combined disk diffusion method (CDDM). Genotyping screening was done by PCR for detection of *bla*CTX-MU, *bla*SHV, blaOXA-23, and *bl*aTEM genes. According to the outcomes of the study, 77 (38.5%) samples exhibited growth upon cultures from which most isolates were Klebsiella pneumoniae (24.67%), Pseudomonas aeruginosa (16.88%), E. coli (37.66%), and Acinetobacter baumannii (20.8%) respectively. The antimicrobial susceptibility profiling showed that 74% of isolates were MDRs and 25.9% were XDR. 38.96% isolates were positive for ESBLs and showed maximum resistance against Ampicillin (57%), Cefepime (54%), Ceftriaxone (44%), Amikacin (57%), Meropenem (49%), and Trimethoprim/Sulfamethoxazole (62%). Molecular characterization of ESBLs genes that were blaCTX-MU (50%), blaTEM (13%), and blaOXA-23 (26.6%). It has been inferred that β-lactamase production in GNB was established to be one of the main reasons for resistance to multiple drugs

Seroepidemiology and the Molecular Detection of Trypanosomiasis in Horses and Camels in District Jhang, Punjab Pakistan

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Trypanosomiasis is one of the most pathogenic infections of livestock caused by several *Trypanosoma* species, affecting both animals and humans, causing severe economic losses and severe illness, respectively. The objective of the present study was to determine the seroprevalence and the risk factors associated with trypanosomiasis in District Jhang, Punjab Pakistan. For this purpose, blood samples were randomly collected from animals (n=300) including camels (n=150) and horses (n=150). Questionnaires were used to collect data on risk factors associated with trypanosomiasis before the sample collection. All samples were initially screened by thin smear microscopy and formol gel test. Later, these samples were further processed by PCR. The overall seroprevalence detected by microscopy and PCR for trypanosome *evansi* was 8% (12\150) in camels and 6.66% (10\150) in horses. The seroprevalence was higher in females as compared to males. The current study confirms that trypanosome *evansi* is widespread in camels and Horses in district Jhang. This study will help the higher authorities and researchers to take effective control measures against this disease.

Keywords: Trypanosomiasis, Livestock, Seroprevalence, Microscopy

Occurrence and characterization of ESBLs in Gram-negative Multidrug-resistant bacteria from health-care settings.

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The nosocomial infections are mainly caused by the bacteria which show resistant against multiple drugs, mediated by the presence of Extended Spectrum beta-lactamase (ESBL) enzymes. Despite the practice of aseptic measures, a heavy load of bacterial isolates is always present in the confined areas of the hospitals. This study aimed to observe the prevalence and the antimicrobial susceptibility profiling of the multidrug-resistant ESBL producing Gram-negative bacterial isolates located at the various sites of the public and private hospitals of Jaranwala city, District Faisalabad. Total 180 samples were taken from the sites present in different sections of hospitals including Gynecology OT, Main Operation Theatre, Ophthalmology OT, Intensive Care Units (ICU), General Wards and the Out Door Patient Department (OPD). Out of the 180, 150 samples were the swab samples collected from the various surfaces through swabbing technique and 30 were passive air samples collected via the settle plate method. Upon processing, 44% of samples were identified as contaminated. The Gram-negative bacterial isolates identified were *Enterobacter aerogenes* 15 (18.7%), *Escherichia coli* 13 (16.2%), *klebsiella pneumoniae* 11 (13.7%), *Pseudomonas aeruginosa* 10 (12.5%), *Acinetobacter baumannii* 8 (10.0%), *Proteus mirabilis* 7 (8.7%), *Serratia marcescens* 6 (7.5%), *Citrobacter freundii* 4 (5.0%), *Shigella sonnei* 3(3.7%) and *Neisseria meningitidis* 2 (2.5%). Antibiotic susceptibility Profiling was done using Kirby-Bauer's disc diffusion method. High resistance was detected against the Ciprofloxacin and Ceftazidime, Imipenem was established as effective against nearly all strains. Molecular identification of the isolates confirmed the presence of ESBL genes bla_{TEM}, $bla_{CTX\text{-}M}$, bla_{SHV} and bla_{OXA} genes. 6(46%) isolates of the *E. coli* were identified as ESBL producing followed by the *E. aerogenes* 6(39%), *k. pneumoniae* 5 (45%) and *P. aeruginosa* 5 (50%).

Keywords: Nosocomial infection, ESBL, multidrug-resistant

Zoonotic Transmission of Middle East Respiratory Syndrome- Related Corona Virus (MERS-CoV) from Camels

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Dromedary camels act as an animal reservoir of emerging enveloped, positive-sense single-stranded RNA containing viral pathogen of zoonotic importance i.e. Middle East Respiratory Syndrome-related Corona Virus (MERS-CoV) of genus beta coronavirus lineage 2C. Prevalence studies based on RT-qPCR, direct antigen detection assays, monoclonal antibody-based ELISA and lateral flow immunoassay platform has been used for isolation, detection and identification of the virus in both humans and dromedary camels since years. Bats are a reservoir of many ancestor coronaviruses that are related to the MERS-CoV. The serology of samples reveals that the seropositive rate of virus spread in East African camels was > 80% and it spread to the Arabian Peninsula through the export of infected camels. Data analysis of World Health Organization (WHO) reports indicating that the high incidence of primary cases of MERS (54.9%) in males is relatable to their direct and close contact with infected dromedary camels either through physical contact with the animal and/or it's secretions (47.1 %) or through consumption of its infected products such unpasteurized milk and raw meat (44.5 %). The cases of human to human transmission of MERS-CoV are rarely seen. The transmission of the virus from camels to humans occurred mostly due to direct contact. Knowledge about the route of transmission of virus will give us information about the preventive measures that are needed to be adopted for stopping further spread of the virus around the globe. For future development, it is suggested to fasten the vaccine formation process by involving government and big-pharma companies.

Keywords: MERS-CoV, Camel, Zoonosis, RT-qPCR

A review of the impacts of climate change on various crops in Pakistan

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Climate change and its impacts on water resources and crop production is a major issue of all developing countries like Pakistan and the rest of the world. Climate change badly affected the agriculture production in Pakistan especially wheat and cotton crops. Agriculture sector plays a central role in the economy of Pakistan as it contributes 18.9 per cent to GDP. Depending on regional conditions and crop varieties, climate variability may cause serious consequences on crop yield per unit area. Extreme warming is very harmful to rainfed crops but beneficial to irrigated agriculture. Due to dramatic changes in the weather pattern, the yield of cotton and rice so declines. Climate change disturbs the rainfall patterns and increases the temperature and this increased temperature cause serious consequences on the yield and growth of cotton and wheat crops. So, it is necessary to take steps at the government level to control the impacts of climate change on various crops. First, we should control the concentration of carbon dioxide and methane gas in the atmosphere by implementing controlled strategies. Second, provided the flexibility of agro-technology and sufficient resources for farmers, the adverse effects of climate change might be overcome by increased use of fertilizers, expanded irrigation, and by the introduction of new crops varieties.

Keywords: Climate change, Rainfall pattern, Carbon dioxide, Methane concentration.

A review on vaccination control of Toxoplasma: One Health Approach

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Toxoplasmosis is a zoonotic infection with global influence, now admitted as one of the most important food-borne infections and the main reason to decrease the livestock industry's production rate worldwide. A one health tactic to progress a vaccination scheme to tackle toxoplasmosis with a realistic and attractive view. Data against infection, i.e., epidemiology, parasite transmission ways and key groups, have aided in marking main species and consequences for a vaccine design. These would be reduced congenital infection in women and sheep and decreased cysts in food-animal species, decreasing oocyst shedding in cats. It develops protective immunity by the cell-mediated immune response, clarifying why a live vaccine is mostly more active against

toxoplasmosis infection. The current advancement in parasite genetics, strain difference, gene manipulation, basic antigenic epitopes, distribution system, and immune replies' initiation contribute to developing new vaccines that may be more extensively applicable. The key role in processing vaccine development is to invent standard vaccine efficacy in related animal hosts. This is a one health tactic carrying together researchers across various fields to the same benefits. The methods and technologies are shown to real effect against toxoplasmosis by using vaccines against a collective will to make it happen.

Keywords: Toxoplasmosis, vaccines, one health, animals, humans, control

In vitro efficacy of cranberry (*Vaccinium macrocarpon*) extract against uropathogenic *Escherichia coli, Klebsiella pneumoniae* & *Proteus mirabilis* from human and animals (Dogs) in District, Lahore, Pakistan

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Urinary tract infection (UTI) is an infection caused by bacteria that harms any part of the urinary tract. Without treatment bacteria may invade the urethra and proliferate there, causing kidney infection UTI, with its diverse clinical syndromes in affected host groups. Recurrent urinary tract infections (rUTIs) present a significant problem for women. In this study, both human and dog urine samples were examined. All samples were cultured aerobically on blood agar, MacConkey agar, and CLED medium (Oxoid). The commonly isolated pathogens were *Escherichia coli*, *Klebsiella pneumonia,* and *Proteus mirabilis*. All uropathogenic isolates were subjected to antimicrobial susceptibility testing using cranberry (*Vaccinium macrocarpon)* extract. Zones of inhibition were measured for uropathogens where *Escherichia coli* and *Proteus mirabilis* were more susceptible than *Klebsiella pneumonia.* Cranberry extract is a safe, well-tolerated supplement that is anti-infective, anticancer, and antioxidant. These effects warrant further clinical research to better place the role of cranberry products.

Keywords: UTI, Bacteriology, Cranberry extract, Human female, Dogs

Frequency, etiology and enzymatic biomarker of subclinical mastitis of Thalli sheep in District Layyah, Pakistan

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Mastitis is a tenderness of the mammary gland which is characterized by physical, pathological, and chemical changes in the milk and mammary gland, causing severe economic losses and foodborne diseases in humans. Mastitis in sheep has obvious financial importance. It is one of the basic causes of the 'milk-drop syndrome of ewes. It is also affecting the mutton producing flocks, as drop milk production can lead to the substandard growth rate of lambs. The objective of the present study was to evaluate the subclinical ovine mastitis distribution in the Thall district of Layyah and to find a correlation between the Surf Field Mastitis test (SFMT), Bacteriology and lactate dehydrogenase (LDH) activities. LDH in milk is a sensitive indicator of epithelial cell damage and subsequently proposed that LDH originated mainly from the damaged udder epithelial cells. LDH is a parameter that might be suitable for use in the early diagnosis of SCM in Sheep. Questionnaires were used to collect data on risk factors associated with subclinical mastitis before the sample collection. For this purpose, milk samples were randomly collected from Sheep (n=200). Surf field mastitis test was performed initially to determine subclinical mastitis. Bacteria were cultured and identification of staphylococci species was performed by using a commercial kit. LDH activity is planned to be determined using a commercially available ELISA kit. This study will help the determine, frequency, etiology, and enzymatic biomarker of subclinical mastitis of Thalli sheep in District Layyah. This will ultimately help to lower the incidence of mastitis in sheep and help to improve quality ovine milk (dairy) production for human use.

Keywords: Subclinical mastitis, Bacteriology, lactate dehydrogenase (LDH) activities, biomarker

Epidemiology of Canine Cyclic Thrombocytopenia and Granulocytic Anaplasmosis: Emerging Diseases of Veterinary and Public Health Significance

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This review spotlights on the global epidemiological status of canine anaplasmosis at human-animal interface. Canine anaplasmosis is an important to disease worldwide, mostly caused by *A. platys* and *A. phagocytophilum* with zoonotic potential. Transmitted chiefly by ixodid ticks. Nonetheless, a vertical transmission has also been reported for these tick-borne pathogens. *A. platys*, chiefly affect platelets of canines. Whereas, *A. phagocytophilum* is the most wide-ranging zoonotic pathogen infecting a broad diversity of vertebrate hosts. The diagnosis is based on clinical and epidemiological verdicts, identification of intracellular inclusions attained through stained blood smear test, detection of antibodies and nucleic acid but usually, sequencing is required for verification. Serological cross-reactivity is the main issue during serodiagnosis. The prevalence varies from area to area depending upon tick contact. Tetracyclines are significant drugs for human-animal anaplasmosis. No universal vaccine is yet available that guards against diverse geographic strains. Detection of vectors/reservoirs, control of ticks, rearing of tick defiant breeds, anaplasma/tick vaccine, prevention of iatrogenic/mechanical transmission and endemic stability are significant control strategies for animal anaplasmosis. While, lowering the high-risk tick contact activities (such as gardening, hiking), careful blood transfusion, circumventing immune-suppression, recognition of reservoirs/vectors and their control are significant control strategies for human anaplasmosis.

Keywords: Canine, Tick-borne diseases, Anaplasma, epidemiology, diagnosis

Cheyletiella Mite: A Review of Zoonosis and Cosmetic Compromise In Pets

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Cheyletiella is a non-burrowing mite, causing a disease called cheyletiellosis. It is a highly contagious skin disease of cats, dogs, rabbits and humans. These mites nourish the tissue fluid and the surface debris of the host and live in the epidermis of the host animal. The condition is also referred to as walking dandruff because of excessive scaling, mealy or powdery appearance of hair coat and large whitish mites' appearance across the fur and skin. In humans, it causes dermatitis, which may be present in the form of bullous or papular lesions. Red raised rashes also appear on the buttocks, trunk, and arms that later turn to a yellow-crusted area. Diagnosis can be done by the general physical examination. Cutaneous cytology should be performed for the confirmation of the disease. A wide variety of topical treatments including, lime sulfur, fipronil, pyrethrin, is available. Proper disinfection of all the exposed bedding material is very necessary to prevent the reoccurrence of the disease. The prognosis, however, is excellent and up to complete resolution.

Keywords: Cheyletiella mite, walking dandruff, cutaneous cytology, zoonosis.

Role of Parasites for Protection of Environment as Bio-Indicator

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Bioindicators are substances which we use for environment protection. They can assist us in the prevention and understanding of the outcome of harmful environmental degradation processes. These substances are also helpful for measuring toxic exposures. This bio-indicators help in assessing habitat alterations by observing the changes in their numbers, physiology or chemical composition. These are usually free-living or parasite species that are sensitive to pollutants in their environment. The cestodes of shark tend to act as bioindicators in aquatic ecosystems. For example, paraorigmatobothrium and anthrobothrium can act as an indicator for the accumulation of heavy metals in water bodies. They show changes in their physiology, morphology and behaviour by a change in environmental parameters. These species may even die as a result of changes in the ecosystem. The parasites may be the best indicators for the detection of a change in the environment.

Keywords: Bio-indicator; Parasites; Environment; Toxic exposures

Schistosomiasis is a Public Health and One Health Concern

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Schistosomiasis or Bilharzia is a parasitic disease of public health concern. It is considered one of the most neglected diseases in underdeveloped tropical countries. Around 140 million people around the world are affected by this disease. Nearly 90% of the disease burden is in the African continent. Schistosomiasis is a chronic and debilitating disease leading to prolonged ill-health. There are six different species responsible for the disease. Of all these six species, *S. mansoni* and *S. hematobium* are the most prevalent and cause severe infection. Children are relatively more susceptible to this disease than adults. Schistosoma is blood flukes and requires intermediate host i.e. snail to complete their life cycle. The eggs of these parasites when trapping in the host body tissues, it leads to inflammatory response and disease patterns. Schistosomiasis is a global health concern and multiple efforts have been made for control. Praziquantel is the most important and effective drug for the treatment of this disease. In terms of control, the provision of a good hygienic environment in underdeveloped countries is the most important strategy.

Keywords: Schistosomiasis, Chronic Disease, Global health concern, Blood flukes

Use of botanicals for treatment of giardiasis to minimize hazards of metabolites of chemical drugs

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Giardiasis is major issue to animals and is commonly found in the environment. It causes GIT problems in humans and the animals and is among the major diseases transmitted via animals. The drug of choice for the Giardia belong to nitroimidazole family; mainly metronidazole for animals as well as humans, there are 5 metabolites of metronidazole which are formed after detoxification in liver. The hydroxyl metabolites have longer half-life than the original drugs and mainly excreted from urine and feces. These metabolites my cause paresthesia, nausea, peripheral neuropathy and ataxia. These metabolites are transferred to human on consumption of meet. To avoid these effects herbals are recommended. A lot of herbals have been tested against the giardiasis and have proven effective. They leave no toxic metabolites I the body having public health significance. There is a need of researches in studying the mode of action and way of administration of these antimicrobials.

KEYWORDS: Botanicals, Giardiasis, metabolite, public Health, Liver

Potential of S-protein based on receptor binding domains to design structural vaccines for MERS-CoV

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An emerging zoonotic pathogen, betacoronavirus is a positive-sense, enveloped RNA virus with a genome that encodes the structural S-proteins. It causes Middle East Respiratory Syndrome (MERS) with serious respiratory infections including symptoms of fever, cough, and shortness of breath in humans and camels. It was 1st reported in the kingdom of Saudi Arabia in 2012 and also reported in Pakistan as an emerging zoonotic disease of humans and camels. Dromedary population of East Africa and the Middle East are the major reservoir host for MERS-CoV, originated from bats and an animal source of infection in humans. Transmission from bats to humans is not direct but intermediated by dromedary camels. In a human's intestinal tract may be an alternative route for infection. It may lead to deciding for researchers to design structural vaccines based on receptor binding domains of S-proteins. The MERS-CoV genome involves four major structural proteins, having spike S-protein. S-protein has a major role in viral infection. The receptor-binding domain (RBD) of the S-protein is having a specific neutralizing domain that is a central target for the development of MERS vaccines and therapeutics. The main objectives of these vaccines are to illustrate the potential challenges and strategies to further improve vaccine efficacy and to understand MERS transmission, epidemiology, and pathogenesis, control strategies, and discuss prospects for MERS research in Pakistan.

Keywords: Coronavirus, Respiratory infection, Camels, Receptor binding domains, Vaccination,

Seroprevalence of Middle East Respiratory Syndrome Coronavirus in Dromedary and Human in Pakistan

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Middle East Respiratory Syndrome Coronavirus is a fatal zoonotic pathogen that causes an acute viral disease named Middle East Respiratory Syndrome. In 2012, this infectious pathogen was first time reported in the Kingdom of Saudi Arabia. Molecular and epidemiological studies overt that dromedary camels which are having one hump on the backs have been identified as animal reservoir hosts and a source of MERS-CoV infection to humans and between humans. Pakistan is one of the eight countries worldwide and the only country outside of Africa, which has almost 1 million population of the dromedary. In Saudi Arabia, Oman, Republic of Korea, Egypt, Kenya, and United Arab Emirate MERS-CoV was documented. This virus is highly pandemic which needs greater surveillance. Studies have already been conducted in Pakistan from 2015 to 2018, to detect the MERS-CoV through ELISA and other molecular techniques by using nasal and serum samples. Areas chosen for sample collection include free-roaming herds, animal markets, and butchery. Sites were randomly chosen in the urban areas of Pakistan for human sampling. From the hospitals, primary health care centers, and the blood banks, human serum samples were collected. In those studies, IgG against MERS-CoV was detected which indicates a high prevalence rate in adult camels aged [10 years (81.37%) and is followed by those aged 3-10 (78.65%). In females, as compared to males higher prevalence is noticed. In summary, based upon seroprevalence data it is an alarming situation where emergency research, response, and policy should be implemented to safeguard the camel and human population in Pakistan.

Keywords: Middle East Respiratory Syndrome, Reservoir, Pandemic, Prevalence.

Mutton and Chicken: In Perspective of one Health

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Balance diet is an essential segment of human nutrition to maintain a healthy life. The major components of human food are carbohydrates, protein, fats, vitamins and minerals along with water. It is highly important to include various food resources of different classes to ensure presence of all nutrients in the diet. Commonly carbohydrates are used by our masses and majority is deficient in consuming protein sources. Protein is an integral part of diet and required for normal growth and functioning of body systems. Among protein sources, animal origin protein is highly digestible, more balanced in amino acids and have more biological value. The deficiency of protein leads to various disorders and stunted growth in human population. The single major reason of less use of protein sources, especially of animal origin is their availability at affordable prices. Animal origin protein sources mainly comprised of eggs and meat. In compliance to modernization and technology development, animals have been genetically improved for maximum yield to fulfill the human food demand as existing breeds would not been able to sustain the food supply chain. This scientific development is mirrored as suspicious by a certain group of people and force the public to use conventional protein sources and not letting the innovative technology to flourish which has a great potential to provide the same nutritional profile in cheaper cost with better efficiency. The nutritional composition of conventional chicken and broiler are same even with better contents in some respects. On the other hand, there many self-made theories about beef and mutton regarding their profile, consumption, and effects on body. This study aimed to present a facts based review on nutritional profile of conventional eggs, commercial layer eggs, chicken, broiler, beef, mutton and importance of their use in daily food on regular basis to maintain a healthy life style and recommend to include any type of meat and eggs in routine diet plan without any prejudice.

Keywords: Poultry, public health, eggs, meat

Antioxidant, Anticancer and Genotoxic Evaluation of Aqueous Extract of *Opuntia Dillenii* Stem

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Opuntia dillenii is a garden plant and used in Asian traditional medicine. Its common is "Chitarthour" in Pakistan. In this study *in vitro* antioxidant, anticancer and genotoxic evaluation of aqueous extract of *Opuntia dillenii* stem was carried out. The phytochemical analysis and antioxidant activity were estimated with total phenolic content (TPC), total flavonoid content (TFC) and 1, 1-diphenyl-2-picrylhydrazine (DPPH) assay, while anticancer and genotoxicity were evaluated by using methyl thiazoletetrazolium (MTT) and comet assay, respectively. Six different concentration of aqueous extract of *Opuntia dillenii* stem were used (10, 50, 100, 150, 200 and 400µg/mL). The extract exhibited significant antioxidant activity with 50% inhibitory concentration (IC_{50}) 56.27µg/mL, while TPC and TFC were 234mg GA/g and 158mg QE/g respectively. The anticancer and genotoxicity effect of aqueous extract of *Opuntia dillenii* stem were observed above the range of 400µg/mL. The selectivity index of anticancer activity was 1.55 and genetic damage index (GDI) was 0.72. Statistical analysis showed the non-significant difference ($P>0.05$) between the genetic damage indices (GDI) of the all tested dose of aqueous extract of *Opuntia dillenii* stem. It may be concluded from this study that aqueous extract of *Opuntia dillenii* is a potential antioxidant agent.

Keywords: *Opuntia dillenii*, MTT assay, COMET assay, DPPH

Antibacterial activity of ofloxacin in combination with ketoprofen against *Staphylococcus aureus* and *Pseudomonas aeruginosa* isolated from clinically infected patients.

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The antibiotic use has been increasing to treat chronic and acute bacterial infections. However, some harmful effects are associated with the excessive use of antibiotics. These harmful effects can be evaded by novel therapies with increased antibacterial activity and reduction in side effects of antibiotics, hence restricting their use. Some non-antibiotics such as non-steroidal anti-inflammatory drug may exert antibacterial potential when given in combination with antibiotics. This study aimed to explore the synergistic effect of a fluoroquinolone i.e. ofloxacin in combination with an NSAID i.e. ketoprofen against *Staphylococcus aureus* and *Pseudomonas aeruginosa* causing respiratory tract infections. The antibiotic sensitivity test was performed by disc diffusion method and the minimum inhibitory concentration (MIC) was calculated by broth dilution method. Synergy tests were performed by checkerboard microdilution method and its safety evaluation was performed by MTT assay. The MIC of ketoprofen against *S. aureus* and *P. aeruginosa* was observed to be 512µg/ml, while that of ofloxacin against *S. aureus* and *P. aeruginosa* was 64µg/ml. The combination MIC of ketoprofen and ofloxacin against both bacteria turned out to be 0.25µg/ml. The FICI observed through checkerboard method was ≤0.5, showed synergism between the antibacterial effects of ofloxacin with ketoprofen. Cytotoxic evaluation revealed that ketoprofen showed cytotoxic effect when used alone i.e <50% cells were survived as compared to combination use, where survival percentage increased (>50%). Therefore, it is safe to use them in combination against *S. aureus* and *P. aeruginosa* infections which also showed improved antibacterial potential that might help to overcome the antibacterial resistance problem.

Keywords: Ofloxacin, Ketoprofen, Staphylococcus aureus, Pseudomonas aeruginosa, Respiratory tract infection

An Epidemiological Study Of Crimean Congo Hemorrhagic Fever (CCHF) In Balochistan

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Crimean Congo Hemorrhagic Fever (CCHF) is an acute, widespread, severe zoonotic viral disease. It is caused by tick-borne virus, a member of Nairovirus genus of the family Bunyaviridae. The genus consists of many important sero-groups but the most important sero-group is CCHF group, which includes CCHFV that is considered to be pathogenic to human. *Hyalomma marginatum* is particularly important vector in CCHFV. In addition to tick bite transmission, virus is also transmitted to humans either by direct contact with infected animals or by indirect contact with blood, body or tissue fluids, respiratory secretions of infected animals or patients. The objective of the current study was to identify risk factors of CCHF disease in Baluchistan. Total 61 Cases (serologically confirmed hospitalized patients) and 61 age and gender matched controls were enrolled in the study from different hospitals of Balochistan during 2013-14. Controls were patients hospitalized in same hospital for other diseases like food poisoning accidents. After their written consent they were interviewed and data was recorded in pre-designed questionnaire. Data was statistically analyzed to calculate odd ratios (OR) and 95% confidence interval (95% CI) for degree of association of suspect factors covered in questionnaire. Statistical analysis was done by SPSS. Significant associations have been observed for occupational (shepherds, farmers, butchers, slaughterhouse workers, veterinarians, doctors, healthcare workers) factor (OR 2.8, 95% CI 0.6813-2.84) and travel history related with animal business (OR 2.5, 95% CI 1.1917-5.451). Other factors which have shown causative association with CCHF were rural living (OR 1.9, 95% CI 0.9032-4.0928) and contact history (with animals, body fluids, blood, saliva, serum, tissues of infected animals and humans) (OR 1.4, 95% CI 1.3593-6.2138). The fatality rate of CCHF recorded during current study was 39.34%. CCHF was more prevalent in males (80%) compared to female (20%). Young individuals (<40 years of age) were found at higher risk of the disease. Most prevalent clinical symptoms recorded were fever (98%), body ache (97%), bleeding (80%) and skin rashes (47%). CCHF is a contagious disease with high fatality rate. Definite guidelines should be designed for the prevention of the disease and to educate susceptible groups regarding mode of spread of disease.

Keywords: *Hyalomma marginatum,* Nairovirus genus, CCHF.

Impact of Heavy Metal Residues on Teddy Goat Grazing in Natural Environment

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Heavy metal toxicity is increasing day by day due to increasing trends of urbanization and industrialization in developing countries like Pakistan. Toxic effects of Pb and Cd have been studied in animals and humans all over the world. Contaminated water and forage are the major sources of heavy metal accumulation in animals and are excreted in milk and meat. Pakistan is rich in livestock population and demands the need for research work to investigate the residual levels of Pb and Cd in foods of animal origin. The hazardous effects of two heavy metals were observed in adult goats of the teddy breed as teddy goat is a major source of mutton in Pakistan. The samples were collected from a clean area and were compared with the sewerage drain area. The serum was analyzed for the level of heavy metal residues along with liver and kidney functions. The mean values of Pb were significantly higher ($P<0.05$) in the contaminated area but the blood parameters were showing a normal range. The serum ALT, AST, and urea levels were also within the normal range in both areas which showed the tolerance of teddy goat against heavy metals. This research also reveals that the teddy goat might be a useful animal for the production of mutton as a safe food.

Keywords: teddy goat, mutton, heavy metal, liver, kidney.

A Cross-Sectional Survey on Ecology and Epidemiology of Bat Rabies in Pakistan. One Health Perspective

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Serologic evidence of rabies exposure was identified among bats in the Indian subcontinent. Interactions at the human-bat interface are complex and include a variety of cultural and agricultural practices. A knowledge, attitude, and practice baseline assessment targeted at populations at risk for exposure to bats would be beneficial in developing public health education and intervention strategies for bat associated zoonoses. A cross-sectional study was conducted using structured questionnaire among individuals (n=1466) from ten districts representing two topographic residential communities (Mountainous and Plain regions) in Pakistan, to investigate the ecology and epidemiology of *Lyssaviruses* and their association with bats. Our results revealed that people who saw bat left-fruits in their garden, had two times more chances to get bat bite (134 (32%)) as compared to those who had not seen bat left fruit (168 (16%)). Univariate analysis model highlighted that only topographic residential backgrounds (Mountain & Plain) and not the provincial residential backgrounds, had significance ($p< 0.05$) in describing bat bites and human rabies related deaths as a result of not visiting doctor after bat bite exposure. Our findings indicate the necessity of a One Health comprehensive surveillance system for emerging and re-emerging zoonotic pathogens, including wildlife as a potential Lyssavirus reservoir, within a context increased public health education efforts targeted at bats.

Keywords: Serological, Topographic, Lyssavirus, Baseline, Assessment.

Inhibitory analysis of rosin against multidrug resistant *Staphlyococcus epidermidis*

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Antibiotic resistant is a global threat that establishes microorganism-induced disease resistance. *Staphylococcus epidermidis* (*S. epidermidis*) has gained resistance to a wide range of antibiotics prescribed are associated with increased morbidity and mortality rates which vary across different geographic areas. The infectious pathogen may be part of or acquired from the hospital environment as part of body commensals. The resistance established against most antibiotics is due to physician's misuse and excessive prescribing. In this case, natural compounds derived from antimicrobial plant rosin are evaluated against *S. epidermidis*. The aims of the study is to determine the prevalence of *S. epidermidis* isolates from different clinical specimens and analysis of rosin and rosin adduct resistance of the *S. epidermidis* in clinical isolates. Sensitivity to antibiotics against *S. epidermidis* was tested by the process of disk diffusion and rosin maleic anhydride adduct in five specific concentrations of 25, 50, 75, 100 and 150 mg L^{-1} by process of well diffusion. Total 60 samples were collected, which showed maximum growth of *S. epidermidis.* They were collected from different sources which include pus, blood, urine and ear swab. Out of 60, *S. epidermidis* was present in 19 (31.7%) samples. The isolates of *S. epidermidis* recovered from pus was (N = 8), whose percentage is 42.11%, from urine it was (N=8) and percentage was 42.11%. *S. epidermidis* showed maximum resistance to antibiotics fosfomycin, (89.47%), amoxicillin, (78.95%) and cefoxitin (73.68%). Rosin adduct inhibition against *S. epidermidis* showed batter activity compared to rosin. This study concludes that modification of rosin with maleic anhydride is an effective means of improving the rosin bacteriostatic and inhibitory action against *S. epidermidis.*

Keywords: *S. epidermidis* isolation, Antibiotics testing, Rosin and Rosin Maleic anhydride adduct sensitivity testing.

Brucellosis: A Zoonotic Reemerging Disease: Limitations of Diagnostic And Monitering Approaches

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Brucellosis is the second most important zoonotic disease of the world after tuberculosis, infecting all kinds of animals as wildlife, livestock and marines with exception of equidae family, but there is still a potential of infecting them with *B. abortus* and *B. suis*. Veterinary and Para veterinary staff is more prone to this infection as direct contact is its main source of spread. In remote areas, where women are involved in animal handling, can be infected and can transmit it to their children, immunocompromised persons and the elderly people. Elusiveness and hazardous nature of the pathogen calls for Serological testing, that cannot detect brucellosis due to non-significant levels of antibodies to the sub-acute *Brucella* infected ones that limits the application of screening, which is mainly done by testing for serum agglutination against Rose Bengal dye and competitive ELISA, or non-specifically testing for Immunoglobulins using standardized agglutination tests. Specific testing without having to culture is possible via Polymerase Chain Reaction and its various updated versions. Loop mediated Isothermal amplification Assay, whole genome sequencing and other omics can be used for the diagnosis of brucellosis in various species and in this way host specificity of some Brucella strains be identified and subsequent pathogenesis studies for development and employment of appropriate control strategies be opted. A due consideration should also be paid on the molecular epidemiological perspectives so that the factor of genetic variability of different strains of *Brucella* cannot be underestimated. There is also a vacuum in the field of monitoring of effectiveness of treatment to the infected ones, that can be achieved by tracing and standardizing the biomarkers of this disease with acute phase proteins and adaptive immunity as an example.

Keywords: Zoonotic disease, Livestock, Marine, Immunocompromised, Vacuum.

Camel Brucellosis: A Zoonotic Reemerging Disease: Limitations of Diagnostic and Monitoring Approaches

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Dromedary camel is found in Pakistan with 21 breeds and its population is soaring in Baluchistan (41%). They have been forsaken among livestock species in their disease diagnostic regime like; parasitism, brucellosis, anaplasmosis, HS and FMD. Overeating disease is rarely observed in camels. Anaplasmosis is also reported with presence of ticks on animal. Hemorrhagic septicemia (HS) infects very large population of camels with *P. multocida* type B having less severity to camels. They do not exhibit any marked severity by glanders. Brucellosis is the second most important zoonotic disease of the world after tuberculosis, infecting all kinds of animals as wildlife, livestock and marines with personals having direct contact with the body fluids of infected ones as a source to spread the disease. The elusive intracellular nature of the pathogen dodges the serological testing due to non-significant levels of antibodies to the sub-acute *Brucella* infected ones. Specific testing without having to culture is possible via Loop mediated Isothermal Amplification Polymerase Chain Reaction, whole genome sequencing and other omics for host specificity of Brucella strains. A due consideration should also be paid on the molecular epidemiological perspectives so that the factor of genetic variability of different strains of *Brucella* cannot be underestimated. There is a vacuum in the field of development of specie specific diagnostic biologicals, drugs, vaccines, monitoring regimes and standardizing the biomarkers of this disease with acute phase proteins and cell mediated immunity as an example.

Keywords: Dromedary Camel, Amplification, Anaplasmosis, Variability, Glanders.

CD209a Potentiates Cell-Mediated Immunopathology in a Helminthic Disease through DCSIGN- And Dectin-2

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Schistosomiasis (bilharzia) is a neglected tropical disease by blood flukes with Infective larvae growth in fresh-water snails before penetrating the skin of humans, laying eggs in mesenteric or pelvic veins, which are secreted in stool or urine or trapped in the surrounding tissues causing inflammatory immune responses as granulomas that result in intestinal, hepato-splenic or urogenital disease, treated by Praziquantel. Eggs of Schistosomiasis orchestrates CD4 T helper 2 (Th2) dominated cell-mediated cytokine response, resulting in granulomatous inflammation and fibrosis. CD209a synergizes with the related CLRs Dectin-2 and Mincle to stimulate increased DC production of IL-1β and IL-23, necessary for proinflammatory IL-17-producing Th17 cells development, C-type lectin receptor (CLR) CD209a (SIGNR5), a homolog of human DC-SIGN senses glycans of schistosome eggs, along with the fact that the understanding of pathogenesis in which CD209a induces Th17 cell response to reduce the immunopathology still needs disclosures till date. There is a need to understand the role of CD 209a in the fate of this disease to apply this information for the development of diagnostic biologicals against this disease that may prove to have more efficient than present-day biologicals of diagnosis, monitoring, and treatment perspectives.

Keyword: Schistosomiasis, Tropical Disease, Praziquantel, Proinflammatory.

Climate change and its impact on parasitic disease epidemics

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Climate change is an emerging issue in our country. Although change in the climate is natural incident but human participation has resulted a progression in the current insecure status of environment. Change in temperature affect the weather pattern and it effects many parasites as well. Climate change affects the population of parasites in several ways. The most premier one is the alteration of temperature. Now a days due to over population, burning of organic fuels and a lot of other activities there is rise of temperature under observation termed as global warming. In result of these activities chances of epidemics has been increased. Recent examples are mosquito born Dengue fever epidemic in Pakistan while vector based transmissible Chikungunya are examples of it. Large number of people are directly infected by emergence and re-emergence of parasitic diseases in different areas while indirect ways infecting the livestock and crops which slows down the advancement and development of communities effecting the overall economic growth. Climate change have great potential to ramp up in negative ways, So, it is very significant to plan on global scale and begin to prepare against these changes that are already underway in a well-planned way to fight back against climate change and parasitic diseases which associated with community which ultimately result in economic loss for our country.

Keywords: Climate change, Parasites, Global Warming, Community effecting.

Dilemma of potential nano-adjuvants in future Anti-Brucella vaccines

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One the one hand vindicators of Anti-Brucella Poly Lactic-co-Glycolic Acid nanoparticles entrapped rL7/L12 convince by its high IgG1 antibody titers, Th1 cytokines as IFN-γ, high proliferation index of the splenocytes to induce inflammation by Lymphocyte proliferation assay, reduced log CFU of splenic bacteria, activation of specific humoral and cellular responses specific to the entrapped Brucella, then on the other hand rOMP25 Chitosan adjuvanted Malate Dehydrogenase antigen of Brucella Nasal subunit Vaccine (BNV) from immunogens as omp19 with sterile Phosphate Buffer Saline induces BNV or BNV plus lipopolysacharide convinces by activataton of IgG in splenocytes, intestines and lungs, IFN Gamma, lymphocyte proliferation, CD-4+ T cell responses, reduction of Brucella in lungs and spleen with induction of humoral and cell-mediated immunity with increased titer of IgG1 and IgG2a antibodies, antigen-specific cell proliferative response with CS and improved Th1-Th2 responses. Despite of the fact that the combined effect of rOMP25 CS adjuvant upon Chitosan-based Brucella nasal subunit vaccine (BNV) has not been demonstrated till now and it should have to be investigated by future researchers. There is embodiment of a potential in the field of the development of even more potent adjuvants that will ensure more safety and potency of the immunogen.

Keyword: Vindicators, Lymphocyte, Malat dehydrogenase, Cell mediated immunity.

Green synthesis of nickel oxide nanoparticles using *Allium cepa* peels for degradation of Congo Red Direct Dye: An environmental remedial approach

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Direct dyes are used in different textile operations and processing. The textile industries are disposing of unused direct dyes into the aquatic environment which is posing a serious alarming threat to aquatic lives. The current study deals with the synthesis of nickel oxide nanoparticles by *Allium cepa* peel extract. Nickel oxide nanoparticles (NiO-NPs) were characterized by SEM. Synthesized NiO-NPs was used to remove Congo red direct dye. Various experimental factors like the concentration of dye & nanoparticles, pH, and temperature were optimized. Congo red direct dye was decolorized up to 90% at optimized conditions (Congo Red Direct dye conc. 0.02 %, catalyst dose 0.003 g/L, pH 6, and temperature 50℃). The real textile industry effluent disclosed 70% decolorization at pre-optimized conditions. The percent reduction in TOC and COD was 73.24% and 74.56%, in the case of Congo Red dye catalytic treatment & percent reduction in TOC and COD were 62.47% and 60.23%, respectively in treatment of textile effluent by nickel oxide nanoparticle. Treated and untreated dye samples were exposed to FTIR and UV-Visible spectral analyses too. The degradation pathway of dye understudy confirmed the formation of non-toxic end-products.

Keywords: *Allium cepa* peels, Nickel oxide nanoparticles, SEM, Congo Red direct dye, Degradation, UV-Visible & FTIR analyses

Occurrence of AmpC beta-lactamase in *Pseudomonas aeruginosa* isolated from urinary tract infections

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Urinary tract infections are frequently encountered illness in humans and also responsible for increased hospital visits worldwide. *Pseudomonas aeruginosa* is the nosocomial, opportunistic micro-organism and quite frequently associated with urinary tract infections. Due to its intrinsic as well as acquired resistance to a number of drugs, it has become a multi-drug resistant pathogen and mostly leads to treatment failure. AmpC β-lactamases are basically drug inactivating enzymes secreted by *Pseudomonas aeruginosa* and their overexpression make bacteria resistant to wide-ranging antibiotic classes. The goal of the present study was to detect the uropathogenic *P. aeruginosa* harboring AmpC beta-lactamases from the urinary tract infections which renders the drugs inactive. Urine samples of 100 persons suffering from urinary tract infections were collected. Pseudomonas Cetrimide agar was used for selective isolation of *P. aeruginosa* which were further identified by biochemical testing according to standard protocols. Molecular characterization of *P. aeruginosa* was done using Polymerase Chain Reaction after extracting DNA. After confirmation, antimicrobial susceptibility testing was done by Kirby Bauer disc diffusion method as guided by the Clinical and Laboratory Standards Institute. Isolates were initially screened for AmpC production by cefoxitin disc resistance. Gene specific PCR was done for the genotypic detection of AmpC β lactamase in the isolated strains of *P. aeruginosa* using specific primers under standardized conditions. Total 36 (36%) *P. aeruginosa* were isolated and 28 were confirmed on basis of molecular identification by PCR assay. These isolates showed maximum resistance towards cefoxitin (100%), ceftriaxone (100%), ampicillin (100%), aztreonam (93%), nalidixic acid (93%), amikacin (82%), gentamicin (75%) and tobramycin (75%). While the resistance rate in other antibiotics was norfloxacin (71%), ceftazidime (71%), ciprofloxacin (64%), Imipenem (61%) and piperacillin (57%), hence these drugs were found effective in treating urinary tract infections that are caused by this pathogen. Out of 21 (75%) Multi-drug resistant isolates, 18 (64%) were confirmed for AmpC beta lactamase production by using gene specific PCR. It was concluded that occurrence of AmpC β lactamase in *P. aeruginosa* responsible for urinary tract infections was quite high. AmpC β lactamase production in *Pseudomonas aeruginosa* was established to be one of the main reasons of resistance to multiple drugs including aminoglycosides, penicillins, cephalosporins and even beta lactamase inhibitor-beta lactam combination drugs.

Keywords: *Pseudomonas aeruginosa*, Multi Drug Resistance, Urinary Tract Infection, AmpC, Beta-Lactamase

Development of user-friendly diagnostic kit for detection of Penicillin residues in dairy milk

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World food safety issues are amongst the important challenges being faced by developing countries such as Pakistan. Serious concerns arise when edible products such as milk, meat or eggs contain drug residues and are marketed without observing recommended withdrawal times of drugs. The sophisticated techniques to monitor drug residues are time consuming and expensive. Conventional lateral flow assays (LFA) are alternative quick residue detection techniques used for screening of biological fluids that give quick and reliable results. Such kits are not available locally and import of these kits is expensive. Therefore, present project was planned to develop antibiotic residue detection kits using nanotechnology following the principle of LFA. Hapten against penicillin (ampicillin) was prepared by making its conjugate with bovine serum albumin to initiate immune response. Primary antibodies against these hapten were raised in rabbits and purified by OA-AS sequential method. Total protein (IgG) content was measured by nanodrop spectrophotometer and their quality was evaluated by direct ELISA. Gold nano-particles were synthesized by citrate reduction method, characterized and conjugated with antibodies. Competitive format was used for test strips. The NC membrane was divided into control and test line. The gold-nanoparticle conjugates were impregnated on the conjugate pad. LFA using polyclonal antibodies and nanotechnology for the detection of penicillin in biological fluids has been demonstrated and the developed assay could detect MRL values in milk. The visual detection was achieved by using gold nano-particles. Time taken for analysis is 8 to 15 min. The strips are easy to use and can find application of screening of penicillin in biological fluids. This work is submitted to IPO Pakistan for grant of patent vide application number 56/2020 and is funded by HEC under NRPU grant Number 7658.

Keyword: World food Safety, Hapatin, Competitive, Conventional lateral flow assay**.**

The neglected zoonotic diseases – Need of holistic One-Health approach

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Many of the neglected zoonotic diseases (NZDs) have been eradicated from most of the developed countries but still persist as one of the major causes of human illness and mortality in poor-resourced African and Asian countries. Under-reporting of NZD outbreaks leads to inaccurate estimation of their cosmopolitan burden due to which NZD does not fetch the attention of policy-makers and funding agencies to curb the NZD. The incidence of zoonotic among masses can easily be reduced by increasing awareness about the etiological agents of NZDs. Dual benefits in terms of improved animal health resulting in reduced chances of transmission to humans and increases livelihoods of the peasants through augmented animal production can only be achieved by targeting the animal reservoirs of NZD. The effective control of NZD requires both the short- and long-term policies design and implementation with financial commitment. In countries like Pakistan, such goals can only be achieved through public–private partnerships for zoonotic disease control through harnessing social impact ventures. Proper estimation of the burden imposed on the human communities by the NZDs and determination of the cost-effectiveness of integrate control programs can fortify the case for a One Health approach to control endemic zoonotic diseases.

Keywords: Neglected zoonotic diseases, control, One-Health approach, policy making

Cutaneous Clear Cell Adnexal Carcinoma in Two Dogs: Cytology, Histopathology, and Immunohistochemical Features

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Cutaneous clear cell adnexal carcinoma was diagnosed on right forelimb of 6-year-old sterile female dog and other was on right hind limb of 8-year-old male dog. Cytological findings included scattered cell groups with clear cytoplasm borders on the hemorrhagic background. The cells usually had prominent and multi-nucleated oval nucleated oval or round cytoplasm showing anisocytosis, anisokaryosis, karyomegaly. Intranuclear pseudoinclusions were found in some areas. Histologically, the cutaneous neoplasms were comprised of cystic changes and some mineralization in dermis and large oval shaped epithelioid cells having clear cytoplasm. Neoplastic cells were pleomorphic containing large nuclei and prominent nucleoli. Low mitotic index and some psammoma bodies were noted. Immunohistochemical examination revealed that tumor cells were positive for vimentin, S-100, MART1 and cytokeratin (MNF116) but negative for GFAP and SMA. On the basis of these findings and results tumors were diagnosed as canine cutaneous clear cell adnexal carcinoma. In our knowledge this is the first case in which we found psammoma bodies and intranuclear pseudoinclusions on microscopic examination.

Key Words: Dog; Clear cell adnexal carcinoma; Psammoma bodies; Tumor.

Histiocytic Sarcoma: A Male Guinea Pig

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A two-year-old male guinea pig was examined for a firm swelling on axilla that was single solitary mass under the skin. Excisional biopsy was performed to separate this mass from the body of guinea pig. Cutting of this tissue revealed a subcutaneous multilobulated mass involving the skin with some extension into adjacent deep muscles. Histopathological examination revealed marked atypia, numerous mitosis, giant cells, large round to spindyloid cells with ovoid to reniform, pleomorphic anisokaryotic nuclei and abundant eosinophilic cytoplasm. Immunohistochemical staining was performed for confirmation with vimentin, S-100, CD31 and Iba1. The confirmation of diagnosis was based on the light microscopic examination along with the immunohistochemical stains. According to our literature research, this case of histiocytic sarcoma is reported for the first time in guinea pigs.

Key words: Histiocytic sarcoma; Guinea pigs; Iba1; Skin tumor

Altered Hematological and Biochemical Indices; A Suspicion Towards Parasitic Infestation in Livestock

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Parasites are organisms striving for derivation of nutrients from other organisms essential for survival, growth and reproduction. Their control and combat strategies have always been a challenge for the cattle producers and veterinarians since they are suggested to be a leading cause for the losses incurred in the form of meat, milk and hide. The livestock sector witnesses huge number of mortalities each year due to these silent enemies. As these parasites are feeding on the host tissues, significant changes in the hematological and biochemical parameters are expected. In case of well-known trematode infestation such as *fascioloses*, there is a significant decline in Red blood cell (RBC) count, Hemoglobin (Hb) concentration, Packed cell volume (PCV), Mean corpuscular hemoglobin concentration (MCHC), Aspartate aminotransferase enzyme, blood urea nitrogen (BUN) and serum albumin have been recorded. In the same type of trematodes infestation, a rise in Alanine aminotransferase (a key enzyme for liver health), eosinophilia, leukocytosis and serum and high globulin levels have been detected. The famous round worm helminth such as *haemonchus contortus* which harbors the gastrointestinal tract of sheep affects the hematological indices by lowering the RBC count, PCV, MCHC and Hb. Research has revealed that glucose and protein concentrations were also lower in infected animals as compared to healthy ones. Sperm Mortality is another threat posed by the roundworm infestation and is recorded to be higher in infected male animals thereby challenging the reproductive efficiency of male animals. Similarly, cattle infected with *Theileria annulata* on investigation shows lower RBC count, low PCV and lower WBC count along with an altered serum mineral profile in which low calcium, phosphorus and potassium levels were recorded. Babesiosis is another blood parasite of cattle, sheep, goat and canines. Infections associated with babesia species clinically revealed a low RBC count, low PCV, low MCV, and low MCHC concentrations. However, a significant rise in WBC count, eosinophils, total proteins, HDL and LDL was evident. External parasites such as ticks, mites, flees and lice cause anemia and jaundice. Changes in these hematological indices provides an overview to the clinicians for a suspected parasitic anomaly.

Keywords: Parasite, hematology, RBC Count, PCV, Fascioloses, babesia, theileria, anemia.

Effectiveness of Ozone Treatment in Curing Uterine Infections and Associated Mastitis in Dairy Animals

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The current study has been planned to find the association between uterine infection and mastitis; compared effectiveness of ozone treatment in curing uterine infection and mastitis with antibiotic. In experiment I two hundred dairy cows of local breed were screened for mastitis during the puerperium period (≤40 days postpartum) and uterine samples were taken from those cows which were positive for mastitis. Out of 57 mastitis positive animals 11 animals shared same pathogen in both uterine infection and mastitis. Staphylococcus and streptococcus were common in 7 and 4 animals respectively. This result showed that there was significant (P > 0.05) association between uterine infection and mastitis on the basis of common pathogen. In experiment II 52 animals either suffering from mastitis or uterine infections were randomly divided into two equal groups (M and U). Each group was then further divided into two subgroups (MA or MO and UA or UO) to receive either antibiotics or ozone therapy. The mastitic animals in MA groups were treated with antibiotic intramammary twice a day for five days whereas, MO group was treated with intramammary infusion of ozone for single time. Milk samples were collected at 7th, 14th and 21st day post-treatment for CMT to check the efficiency of each treatment regimen. The cure rate was 23.1% and 53.8% in MA and MO group respectively. These results revealed that there was no significant difference (P = 0.226) between antibiotic treatment and ozone treatment. Similarly, animals in UA group were treated with antibiotic intrauterine twice a week for the period of two weeks whereas the animals in UO group were treated with intrauterine ozone for 10 second for four times during a week. All the animals in UA and UO groups were treated with ovsynch estrus synchronization protocol (GnRH-PGF2α-GnRH) on 14th day after the start of ozone or antibiotic treatment. The efficiency of each treatment regimen was determined on the basis of estrus response and pregnancy rate. Estrus response in UA and UO group was 46.2% and 61.5% respectively. This result revealed that there is no significant difference (*P* = 0.695) between antibiotic treatment group and ozone treatment. Similarly, Pregnancy rate was 33.3% and 62.5% in UA and UO group respectively. This result showed that there was no significant difference (*P* = 0.592) between antibiotic treatment group and ozone treatment.

Keywords: Mastitis, Uterine infection, Antibodies, Ozone Treatment.

One Health Program- finding a tangible way forward

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Mankind has been a target of hostile aliments ever since its inception fighting for its existence in the universe. The contemporary world has now been focusing on the emerging domains affecting the life particularly 'the one health'. It's been a while that this idea was coined (a decade past) and the active work on this front was initiated. But this concept has not been flourished to its potential, chiefly because of lacking coordination among the key links. The reasons behind this are multifaceted including but not limited to below par coordination among health personnel, veterinarians and environmentalists. This may be due to lack of facilitating infrastructure among these disciplines in most parts of the world. Thus, no focused efforts are seen and the one health issues continue to threaten the quality and survival of life. The most recent and on-going threat has been the pandemic of COVID-19 which needs no further explanation. Likewise, certain other threats like SARS, Ebola, Zika virus etc. possess the potential to erupt at any time. This is the high time that a tangible way forward may be outlined and worked on through infrastructural development at national (Pakistan) and international level. The World Health Organization can prove to be very instrumental body at international platform. At national fronts, certain goals and targets need to be set on annual basis through coordinated efforts of health professionals, veterinarians and environmental experts. As a proposal to ponder upon, the goals for the first year may be; Formulation of One health Working groups at provincial/national level lead by academia. These groups from three disciplines need to be officially approved from the quarters concerned. This joint group should set and review goals on annual basis and procuring requisite funds from the provincial and federal governments. For the awareness of common masses, this joint group should have a wing of media and extension activities program catering at lower level for this purpose.

Keywords: Interdisciplinary coordination, Working groups, Planning strategies, Tasks achievement

Role of Veterinary Professionals and Concept of One Health

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As environmental changes continue to escalate, it is highly recognized that the health of people, animals, and their environment is interconnected. The human and animals that share an ever-changing environment experience significant health challenge. The veterinary profession around the world can work in every capacity and can help to educate society about environmental protection, food safety, animal welfare, and public health. By advising the farmers related to production issues, recommendations for proper medicine, and maintenance of animal health are important to overcome the food safety problems. Ante-mortem inspection and monitoring of animal welfare during slaughtering and carcass condemnation are the key roles played by veterinarians. In recent times, public health is a core issue as many life-threatening diseases are present in the environment. Veterinarians can design some awareness programs for the community to prevent the introduction of foreign diseases in animals, disease outbreak investigation, and environmental protection by educating the society about animal welfare, husbandry, treatments, proper keeping, and sheltering requirements. Veterinarians can provide laboratory aids and other services to farmers and livestock owners. At the academic level, proper training regarding one health concept to veterinary students, technicians, and scientists by veterinary experts is considered an important part. The research programs for control and diagnosis of infections such as malaria, West Nile fever, Congo virus, and influenza should be initiated where veterinarians can participate and formulate new strategies for the betterment of mankind. The monitoring of the effectiveness and safety of the biomedical products and drugs by professional veterinarians help to find different ways of disease control. So, it is concluded that veterinarians can play valuable and diversified roles in society by collaborating and developing communication with other medical professionals for providing facilities for humans, animals, and environmental protection.

Keywords: Veterinarian, environment, disease outbreak, public health, food safety.

Seroprevalence And Risk Factors of Brucella Abortus In Buffalo (Nilliravi And Kundi) In District Layyah

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The major problem, the livestock department is facing nowadays is Brucellosis. It is a highly contagious and zoonotic disease having huge economic losses including infertility, decreased overall milk production, and abortion. The present study was designed to check the seroprevalence of Brucella Abortus in different buffalo breed of District Layyah. Brucellosis can be detected either by RBPT or MRT. The standard procedure of both tests was performed. The current study shows that the prevalence was found (6.6%) in tehsil Layyah compares to other areas (3.3%). The overall prevalence in the District Layyah was found 4.7% and the breed Nilliravi was found more susceptible than that of Kundi breed. The animals of the age older than 5 years were found to be more susceptible compared to the young. The statistics show that the Brucella Abortus was more prevalent among female buffaloes. So, it is the main cause of the reduction in milk production of buffaloes and many more chances to spread in those people who are directly engaged with these animals. (Veterinary staff and farmers).

Keywords: Brucellosis, Seroprevalence, Buffaloes, Layyah.

Prevalence and antimicrobial resistance of *Campylobacter jejuni* in poultry in District Jhang, Pakistan

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The present study aimed to determine the prevalence and antimicrobial susceptibility of *Campylobacter jejuni* in poultry meat and by-products at retail poultry shops in district Jhang, Pakistan. Broiler meat samples including liver, heart, thigh, breast, and intestinal content (n=400) were collected. Selective pre-enrichment was performed in Bolton selective enrichment broth followed by plating on Modified charcoal cefoperazone deoxycholate agar (mCCDA) under microaerophilic conditions generated by CampyGen3.5 system. The antimicrobial resistance was checked in *C. jejuni* (n=50) against eight (08) different antibiotics. The majority of samples were contaminated with *Campylobacter spp*. (n=260/400), where *C. jejuni* was found as (n=220/400). The mean prevalence of *Campylobacter* in district Jhang was found as 65%, while the mean prevalence of *C. jejuni* was calculated as 55.5%. Enrofloxacin showed highest resistance against 70% isolates, followed by tetracycline 68%, tylosin 66%, ampicillin 64%, ciprofloxacin 62%, colistin 30%, gentamicin 22%, and doxycycline 10%. More than 50% of isolates were found resistant to more than two antibiotics, and 18% of isolates were multidrug-resistant. The study calls for rationalizing the use of antimicrobials in poultry to safeguard public health.

Keywords: *Campylobacter jejuni*; Culture; Antimicrobial Resistance; MDR, Poultry.

COVID-19 Pandemic due to spillover of Virus

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COVID-19 On January 7th 2020 it was confirmed by Chinese authorities that they had identified a new virus that causes pneumonia-like symptoms in humans. The new virus is a coronavirus, which is a family of viruses that include the common cold, and viruses such as SARS and MERS, this new virus was temporarily named "2019-nCoV" now named severe acute respiratory syndrome coronavirus 2(SARS-CoV-2) by International Committee on Taxonomy of Viruses. Three times in the 21st-century coronavirus outbreaks have emerged sometimes those viruses jump from animal species to a human population called a spillover event and can cause disease from animal reservoirs to humans and severe disease and global transmission concerns observed. The virus is originated from bats and pangolins which is linked with the wet markets in Wuhan China. SARS-CoV-2 can jump to other animals such as ferrets and cats has spread quickly to 191 countries to date via direct transmission. Survival of virus depends greatly on the environmental conditions in cold and humid conditions it can survive longer on non-living surfaces that is why it can spread at an exponential rate in the winter season, due to higher reproduction number the virus spreads very quickly among the human population major route of spread is via tiny droplets (aerosols) that can be transmitted from infected individuals to the healthy ones.

Keywords (3-6): Bats, Spillover, Corona Virus, SARS-CoV-2, Covid-19.

Development and Characterization of Oral Drug Delivery System Containing Antifungal Agent for the Treatment of Oral Thrush

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The prevalence of oral thrush is increasing day by day which is an alarming situation. For oral thrush, local administration is necessary for speedy recovery from infection and to enhance efficacy and minimize systemic side effects and for specifically targeting the active site. The fluconazole is used for dosage form development because it is more suitable for treatment of oral thrush. Since fluconazole has less water solubility which results in its decreased bioavailability and efficacy. To target this problem of fluconazole, the inclusion complex of fluconazole with β-cyclodextrin was formed which increase its drug stability and improved water solubility and efficacy. The ternary complex of β-cyclodextrin, water soluble polymer along with fluconazole was formed by freeze drying method. The characterization of oral gels showed that G1 oral gel containing F2 complex was the most satisfactory formulation which showed most satisfactory organoleptic properties, spread ability, pH and highest drug content of 88%. Finally, a stable oral gel containing ternary complex of fluconazole, β-cyclodextrin and water-soluble polymer was formed which have increased aqueous solubility and bioavailability which will further enhanced its efficacy. It can also apply locally to the targeted site of action to overcome the problem of systemic side effects of fluconazole to enhance its effective use and treat the oral thrush locally. It also enhances the patient compliance and increase drug stability and residing time and reduced dosing frequency.

Keywords: Oral thrush, Fluconazole, β-cyclodextrin, Ternary complex, organoleptic properties.

Alternatives to antimicrobial drugs in poultry birds: A future perspective

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Poultry production has been booming globally for the past two decades, driven by population growth and urbanization. However, the rapid intensification of modern poultry production also poses public health risks including bacterial food poisoning, epidemic diseases, and the development of antimicrobial resistance (AMR). Antimicrobial drugs are being used prophylactically as well as growth promoters (AGP). Public health can be affected by inappropriate and non-judicious usage of antimicrobial drugs in poultry birds. Researchers have been looking for new alternatives to protect poultry flocks from emerging diseases, while not hindering production performance or affecting profit margins. Possible substitutes may include prebiotics, probiotics, synbiotics, ethnomedicines, nanoparticles, and several other compounds. Probiotics are live, non-pathogenic microorganisms having a beneficial effect on chickens by modifying the immune system and gut microflora. The recent development on *in-ovo* supplementation of probiotics also promoted early colonization of beneficial microflora i.e. *Bacillus* spp. base probiotics (BPP) can reduce the virulent *E. coli* transmission and infection in newly hatch broiler chickens. Garlic, ginger, and black cumin have an antiquated history of medicinal usage, as it enhances poultry health and growth performance. Garlic phytochemicals have an antibacterial, antifungal, and antioxidant effect on chickens. Antibacterial activity of metals and metal oxide nanoparticles has also been reported. Phytogenic compounds and organic acids also stimulate blood circulation, enhances gastric acid secretions, and reduce the load of low pathogenic bacteria. Further investigations are required to explore suitable, reliable, and cost-effective alternatives to antibiotics for commercial usage.

Keywords: AMR, Probiotics, Phytochemicals, Nanoparticles, Phytogenic compounds.

Veterinarians and One Health: Tackling the control of the Poultry Red Mite (PRM), *Dermanyssus gallinae*

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Dermanyssus gallinae, also known as the Poultry red mite (PRM), is a blood-feeding ectoparasite and poses a threat for the avian and other species as well as farmworkers. PRM causes huge economic losses including an estimated annual cost of 4.33€ per 100 birds in France, 4.83€ per 100birds in Italy, 66.85 million € in Japan,11.0 million € in the Netherlands, and 3 million € in the UK (Sparagano et al. 2009). This arthropod pest has a worldwide prevalence circa 80 to 90% (Sparagano *et al.*, 2014). From the One Health (OH) perspective, there are three main aspects of PRM impact on human, animal, and environmental health: Infestation, Treatment, and Prevention. The PRM Infestation affects the health and welfare of avian and non-avian species, including wildlife. Few studies are demonstrating its impact on human health (gamasoidosis), which is relevant for veterinarians and medical practitioners. Zoonotic transmission of pathogens such as Salmonella and the Avian influenza virus is a concern. The PRM Treatment and Prevention include a variety of methods, agents, and techniques that might have an impact on animals, humans, food safety, and the environment. These include the use of synthetic drugs, which could potentially contaminate the farm environment, water supply, and soil. Our developed model could be likely used as a methodology for proposing the OH perspective for other vectors (mosquitoes, ticks, flies) and their transmitted pathogens. This paper will show how PRM control in our BVM Program is used to give a broader and holistic understanding to our future veterinarians.

Keywords: poultry red mite, One Health, control methods, parasites.

Impact of Zika Virus on Pregnant Women

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Zika virus belongs to *flaviviridae* family. Vector of zika virus is *Adese aegypti* mosquito. Zika virus is RNA virus. This vector is majorly found in Tropical areas. It also spread with sexual contact. Recent outbreaks of zika virus are Yap Island outbreak, French Polynesia outbreak, Cape Verde outbreak, Angola outbreak, Singapore outbreak. It was first identified in the America. Till this day there is no evidence of non-primates as reservoir of Zika virus. There is only one case reported of zika virus infection after monkey bite. There is no evidence of sylvatic transmission cycle in Zika virus. Zika virus is considered a Torch agent. Zika virus characterized by influenza like illness in adults, microcephaly in new born babies, death of fetus and nervous system abnormalities. Vertical transmission of Zika virus occurs in all trimesters. Till this day milk born transmission is not confirmed. It is recommended by WHO that breast feeding has to be continued. A chance of infection is more in those pregnant women whose partner has travel history in zika virus infected areas. Diagnosis requires RT-PCR in acute period of infection. Zika virus RNA persists longer in whole blood then in plasma. RNA of Zika virus is detected in amniotic fluid, placenta and brain tissues of fetus. It starts with rash in pregnant women. Zika-positive subjects showed symptoms like fatigue, vomiting and fever less than zika-negative subjects. Zika virus is considered as the trigger of Guillian Barre syndrome. Zika virus infection in early pregnancy is more fetal. Congenital zika syndrome cause developmental abnormalities in fetus like musculoskeletal, pulmonary, ocular and genitourinary system. Deafness is also seen in many cases of infected newborns. Through ultrasound CNS abnormalities has been seen in first trimester. There is still no vaccination available. Only treatment is prevention. A clinical trial of vaccine against has begun. Protection from mosquito bites is the key prevention. Safe sex is recommended. Body shows the humoral antibody response against zika virus. WHO is helping to control zika virus infection by developing integrated surveillance system, strengthening the capacity of laboratories and strengthening support and care of affected families.

Keywords: Salmonella, Molecular characterization, MDR, broiler meat, Lahore.

Prevalence of *Cryptosporidium parvum* in cattle population of nomadic communities in and around Multan, Pakistan

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Cryptosporidium (*C.*) is one of the most important causes of parasitic gastrointestinal disorder in various animal species and results in significant economic losses in dairy sector. Additionally, it has also zoonotic implications and cross-transmission between animals and human beings is also documented. It may also affect wild animals which may act as potential reservoirs for transmission of diseases in domesticated animals and human beings. Keeping in view, this study was conducted to evaluate the copro-prevalence of cryptosporidiosis in cattle population of nomadic communities located in and around Multan-Pakistan. For this study, a total of 184 faecal samples were randomly collected from target cattle population of study area. All the faecal samples were analyzed for the detection of *C. parvum* antigens by using commercially available specie specific ELISA kit (IDEXX, USA). The overall prevalence of cryptosporidiosis in cattle population was found to be 13.59%. The factors including age, herd size, health status, previous GIT problems, source of drinking water, physiological status of females, deworming history, co-raising of other *C.* parvum susceptible animals and vaccination against endemic diseases were found to have significant correlation ($P<0.05$) with copro-prevalence of cryptosporidiosis in cattle population. Contrary to this, some other factors including gender, breed, location, educational status of farmers, feeding pattern, known contact with wild animals and hygienic conditions of housing facility, were found to have non-significant a non-significant correlation ($P>0.05$) with copro-prevalence of cryptosporidiosis in cattle population. In conclusion, *C. parvum* is prevalent in the cattle population of nomadic communities located in Multan-Pakistan. Under the circumstances, it is suggested that effective control strategies should be devised to control infectious and zoonotic diseases including cryptosporidiosis in livestock populations of nomadic communities. The awareness campaigns should be launched for prevention and control of diseases of veterinary and public health. Further, nomadic communities should also be considered as an integral segment while devising diseases control programs at regional, national and global levels.

Keywords: Cryptosporidiosis, Prevalence, Copro-ELISA, Cattle, Nomads, Multan.

Climate Change and its impact on Parasitic Disease Epidemics

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Climate change is an emerging issue in our country. Although change in the climate is natural incident but human participation has resulted a progression in the current insecure status of environment. Change in temperature affect the weather pattern and it effects many parasites as well. Climate change affects the population of parasites in several ways. The most premier one is the alteration of temperature. Now a days due to over population, burning of organic fuels and a lot of other activities there is rise of temperature under observation termed as global warming. In result of these activities chances of epidemics has been increased. Recent examples are mosquito born Dengue fever epidemic in Pakistan while vector based transmissible Chikungunya are examples of it. Large number of people are directly infected by emergence and re-emergence of parasitic diseases in different areas while indirect ways infecting the livestock and crops which slows down the advancement and development of communities effecting the overall economic growth. Climate change have great potential to ramp up in negative ways, So, it is very significant to plan on global scale and begin to prepare against these changes that are already underway in a well-planned way to fight back against climate change and parasitic diseases which associated with community which ultimately result in economic loss for our country.

Keywords: Climate change, Parasites, Global Warming.

Prevalence, Isolation and Characterization of *Anaplasma marginale* in Cattle from District Gujranwala, Pakistan

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The study was carried out to determine the prevalence of tick-borne anaplasmosis in cattle by analyzing blood profile and microscopy at district Gujranwala. In order to achieve this, a survey was conducted, and 90 blood samples were collected randomly from different farms of cattle predominately having history of tick infection, fever, jaundice and anemia from 3 tehsils of Gujranwala i.e. Kamoke, Nowshehra Virkan and Wazirabad. Animals were sampled in different age groups that is, less than 1, 1 - 2 year> 2 years. The findings of present study revealed that the prevalence of *A. marginale* in the prescribed tehsils of Gujranwala was in the following order: Nowshera Virkan>Kamoke>Wazirabad. In addition, females had higher infection rate than males. Moreover, the older cattle were more frequently affected than the younger ones. Blood profile analysis showed a significant decrease in each of the hematological parameters of affected blood samples except Platelets and MCH whose values were enhanced as compared to non-affected blood samples. The sudden decrease in hematological parameters was the leading cause of hemolytic anemia in the affected cattle. It was also concluded that the three tick species i.e. *Rhicephalus microplus*, *Rhicephalus annulatus* and *Hyalomma anatolicum* were the potential transmitting agents of infection in the study area. However, it is the need of hour to develop complete genome sequencing of *Anaplasma* as well as other vector-borne pathogens which will enable us to design appropriate drugs for the treatment of such infections.

Keywords : *Anaplasma*, *Rhicephalus*, *Hyalomma*, Gujranwala.

Zoonotic Threat of Antibiotic Resistant and Virulent Avian Pathogenic *Escherichia coli*

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One of the worst universal risk of today is antimicrobial resistance, which is not only limited to human but also in animals. Consequently, *Escherichia coli* (*E. coli*) commensal bacteria of human and animals have developed multidrug resistance (MDR). Presence of resistance genes have been studied both in food producing animals and human. Inter-transmission of MDR and virulent *E. coli* clones have been studied between poultry and humans. Several studies have been performed to sort out the prevalence of pathogenic *E. coli* in poultry; however, inadequate data are accessible concerning the resistance and virulence profile. This study was designed to observe the resistance and virulence of poultry *E. coli* having zoonotic importance. A total of 225 clinical pathogenic *E. coli* were isolated from broiler farms. Antibiotic susceptibility, β-lactamase detection, resistant and virulent genes detection, biofilm formation and adhesion, invasion and intracellular survivability assays in Raw 264.7 cell lines were performed. Antibiotic resistance was observed against all classes of antibiotics and most of the strains were MDR. Highest resistance was found against ciprofloxacin (74.67 %) followed by ofloxacin (66.22 %) and imipenem (62.67 %). Of them 24.89%, isolates were screened as β-lactamase positive by double-disk synergy test and the prevalent β-lactamase genes were, *CTX-M, CTX-M-1, CTX-M3, TEM-1* and *OXA*. Furthermore, the MDR isolates were containing most of resistant and virulent genes, *aac(3)-IV, cat-A1, cml-A, sul-1, tet-A, tet*-B, and *pap-C, fim-C, fim-H, iuc-D, irp-2, tra-T, iro-N, iut-A,* respectively. These pathogenic MDR poultry *E. coli* was moderate to strong biofilm producers and had strong characteristics of the adhesion, invasion and intracellular survivability. Sharing characteristics with human's isolates, most of poultry *E. coli* were MDR, β-lactamase producers and highly pathogenic and virulent, posing a great zoonotic threat.

Keywords: Antibiotic resistance, virulence, β-lactamase, adhesion and invasion.

An Epidemiological Study of Potential Risk Factors Associated with Cystic Echinococcosis in District Narowal, Pakistan – A One Health Approach

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Cystic Echinococcosis/Hydatidosis is a parasitic disease caused by Echinococcus granulosus (a cestode) of the genus Echinococcus (family taeniidae) It is a serious zoonosis that results in enormous economic damages to livestock industry and poses a serious threat to public health. It can affect an extensive variety of hosts including humans, domestic and wild animals. It has worldwide distribution including Pakistan. Pakistan is an agrarian country and about 70% people are settled in pastoral areas with restricted access to appropriate salubrious services. These settings may errand the epidemics like echinococcosis. Keeping in view the threats caused by hydatidosis to livestock and public health, Current study was designed to gain insights about detailed investigation of the epidemiological risk factors associated with this disease.

A pre-structured Questionnaire was used to collect data from 503 animal owners (226 cattle, 98 sheep, 102 buffalo and 77 goats) mainly farmers and butchers by visiting various abattoirs of district Narowal - Pakistan between September 2019 and February 2020 to identify the epidemiological risk factors and their association with the disease. Collected data was analyzed through Fishers Exact Test and chi-square using Statistical Software R.

Out of 23 variables, 6 variables showed significant association (p-value < 0.05) with the development of Cystic Echinococcosis. These variables were specie of animal, age, feeding pattern, dog keeping, presence of stray dogs at grazing site and distance from nearest abattoir.

The Epidemiological findings of this study could help in developing prevention strategies and control programs for Hydatidosis in Pakistan. An integrated One Health approach - involving the livestock department, public health personnel, healthcare providers, environment science officials and animal owners - is needed to help prevent Hydatid disease in the region. Establishment of policy on dog keeping and handling, promoting construction of abattoirs with an obligatory meat inspection services are highly essential. Control measures should emphasize the interruption of the parasite transmission. Due to the lack of knowledge about echinococcosis transmission, intervention measures should focus on educating the human population, dog owners and communities considered at a high risk of infection with *E. granulosus*.

Keywords : Echinococcus granulosus, Epidemiology, Food animals, abattoir, Narowal

Leishmaniasis – A One-Health Conundrum

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This is a review of Leishmaniasis as it relates to infections in people and animals. Dogs and cats get infected as do people. The disease has horrible ramifications for all three of these species and also (although not in the presentation) also causes lesions in horses. It is a major concern for the poorest populations of the world, and it also causes an extra level of disease in people who find themselves displaced from their normal habitats by national disruptions. Drug exist, but they are not perfect; however, although appearing extreme to the observer, new physical means for treating early cutaneous lesions can have very successful results.

Keywords (3-6): Leishmania, travel, cutaneous, visceral, phlebotomine

Systematic approaches: One medication to one health

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Keywords: Veterinary parasitology, Emerging diseases, Zoonotic diseases, One Health epitome

ABSTRACT

Confronted with complex example of worldwide change, the inseparable interconnection of people, pet, wildlife and livestock animals their social and biological climates is apparent and requires incorporated ways to deal with human and animal health and their particular social and ecological settings. Calvin Schwabe instituted the idea of "one medication" in the 20th century. It perceives that there is no distinction of worldview among human and veterinary medicine and the both disciplines can lend to the improvement of one another considering the more extensive way to deal with health and prosperity of societies. The 1st idea of "one medication" was reached out to "one health" through pragmatic executions and protective validations in various settings. Confirmation for added estimation of a consistent application of "one health" equate with isolated sectorial reasoning is, yet presently developing. Co-ordinated thinking is progressively being advised in clinical practice, scholastic educational programs, services of health, livestock, agriculture and international organizations. Instances of effective frameworks ways to deal with general public health show sudden outcomes. Similar to "system biology" which centers generally on the exchange of proteins and molecules at a sub-cellular level, a systemic way to deal with health in social ecological system (HSES) is a between and trans-disciplinary investigation of complex communications of all health-related fields. "Eco health" and "one health" are related with the HSES hoping to recognize emerging properties and determining factor of health that may emerge from a systemic view going across scales from particles to the ecological and socio-cultural circumstance, to from the correlation with various infection endemicities and health framework structures.

Curative effect of zinc oxide nanoparticles (ZnONPs), moringa oleifera leaf extract (MOLE) for Diabetes

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ABSTRACT

Diabetes has now become a global threat with increased incidence of morbidity and mortality owing to its high prevalence. All three types of diabetes affect the normal functioning and metabolism of body leading to diabetogenic complications most of which are irreversible. Diabetes affects the normal physiology of reproductive system via actions on hypothalamus, pituitary and gonadal axis. Any abnormality in this axis as in case of diabetes, leads to hormonal disturbances, altered physiology of testes, reduction in testes size, poor semen quality and erectile dysfunction results in abnormal spermatogenesis, immature sperm production and infertility. To assess these effects of diabetes along with curative effects of zinc oxide nanoparticles (ZnONPs), *moringa oleifera* leaf extract (MOLE) separately and in combination, the present study was designed. In this way, a total of thirty male albino rats were maintained on routine diet and randomly divided into six groups. The first group was served as control while the remaining groups were diabetic. Second group was the diabetic control group received only alloxan monohydraete at the dose rate of 130mg/kg. The third group was diabetic and treated with standard antidiabetic drug glimepiride at the dose rate of 0.1mg/kg body weight, and fourth group treated with ZnONPs at the dose rate of 7.5mg/kg body weight. The fifth group treated with MOLE at the dose rate of 250mg/kg body weight. The sixth group was received the combination of ZnONPs and MOLE. After 32 days of study, rats were dissected and blood and organ samples were collected on respective days for hematological, biochemical and histopathological analysis. Alloxan-induced hyperglycemia non significantly reduces the body weight, testicular weight, serum testosterone concentration and significantly altered the blood parameters. Serum LH level increased slightly, while FSH level remains unchanged. Combination of ZnONPs and MOLE shows more effective trend toward recovery as compared to if use separately.

Keywords: Diabetes, Zinc oxide nanoparticles (ZnONPs), moringa oleifera leaf extract (MOLE), Treatment

A cross-sectional survey among herdsmen regarding tick-infestation in livestock in Punjab, Pakistan

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Recent global changes have led to an increase in the spread of ticks and tick-borne diseases (TBDs) affecting domestic ruminants and humans. Increased awareness among livestock owners regarding tick and tick-borne diseases (TBDs) is needed to prevent and reduce disease incidence. Keeping this in view, we designed a study and selected 96 livestock farms (having up to 20 animals) in six districts of Punjab, Pakistan and a well-structured questionnaire was organized among the owners. Of the 96 livestock owners, 71.9% (n=69) kept cattle, buffalo, sheep, and goats together, and 38.5 % (n=37) did not consider tick infestation as health-related issue. Almost 29.1 % (n=28) were unaware of acaricidal use against ticks in their animals. Only 18.8 % (n=18) were consulting veterinarians regarding tick infestation for their animals. Our study highlighted the association between livestock owner's consultation with veterinarians and appropriate acaricidal use on their farm (P =0.003). Most of the respondents, 66.7 % (n=64), were practicing manual tick removal (i.e. with bare hands), and our study found a significant association between tick-bites and manual tick removal as a result of this high-risky practice (P=0.012). Our study highlighted that lack of awareness and unrecognized health related issue of tick-infestation among livestock owners causes a high level of disease burden and economic loss, also increasing the possibility of zoonotic TBD transmission. An integrated approach is required for the control of TBD, particularly those of zoonotic concern. For disease management and control, it is important to use One Health approach through unifying efforts of physicians and veterinarians.

Keywords: Tick-infestation, Livestock, TBDs, Zoonosis, On Health

Antibiotic susceptibility profile of housefly-borne *E. coli* isolates in and surrounding areas of Multan, Pakistan

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The reproductive and feeding habits of houseflies make them a significant mechanical vector for infections of both humans and animals. These are also involved in the transmission of multi-drug resistant bacteria such as *Escherichia coli*, *Salmonella*, *Klebsiella*, and *Pseudomonas*, etc. *E. coli* is commonly present in the lower gastrointestinal tract (GIT) of mammals and may cause a range of infections including Neonatal meningitis, Urinary tract infections, Hemorrhagic colitis, and Gastroenteritis, with signs and symptoms that include watery mucoid or bloody diarrhea, abdominal cramps, vomiting, and sometimes temperature. This study was performed to describe the prevalence of multi-drug-resistant *E. coli* carried by houseflies infesting meat shops in and surrounding areas of Multan city. For sample collection of houseflies, ten regions in the city were selected and flies were captured from different spots in a region. Houseflies were transported to the Microbiology Laboratory, FVS, BZU, Multan and processed on the same day. MacConkey agar was used for the primary isolation and IMViC and QTS-12 strips were used for the final identification of *E. coli* isolates. The recovered isolates were used in antibiotic sensitivity testing, using disc diffusion method, against 10 antibiotics from different classes/groups. Overall, *E. coli* isolates were found resistant to cephradine (70%) followed by erythromycin (68%), sulfamethoxazole (58%), cefotaxime (54%), meropenem (36%), amoxicillin (32%), levofloxacin (4%), piperacillin (4%) and amikacin (0%). These are the commonly used antimicrobial classes to treat bacterial infections. Therefore, appropriate steps should be taken to control the population and infestation of houseflies. It is also important to continuously monitor the sensitivity pattern of the pathogens transmitted by the houseflies against different drugs.

Keywords: *E. coli*, Houseflies, MDR, meat, Multan

Antibiotic susceptibility profile of housefly-borne Salmonella isolates in and surrounding areas of Muzaffargarh, Pakistan

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Houseflies (*Musca domestica)* are the mechanical vector of multi-drug resistant pathogens of both humans and animals. *Salmonella* is a prominent pathogen for foodborne diseases (typhoid, nausea, diarrhea, and vomiting). This study was performed to determine the prevalence of *Salmonella* spp. carried by houseflies infesting meat shops in Muzaffargarh city and its surrounding areas. A large number of houseflies (n=240) were captured (March to October 2020), transported to the Postgraduate Microbiology Laboratory, FVS, BZU, Multan, and processed on the same day for bacterial isolation using Salmonella-Shigella (SS) agar. IMViC and QTS-12 strips were used for the final identification of bacterial isolates. QTS-12 results for positive *Salmonella* isolates were Cytochrome oxidase Negative (white), H_2S Positive (black, black traces), Lysine decarboxylase Negative (yellow-green), Ornithine decarboxylase Negative (yellow-green), Voges Proskauer Negative (off white), and ONPG Positive (colorless). The confirmed isolates were used in antibiotic sensitivity testing against 10 antibiotics, using the disc diffusion method. The Salmonella isolates were found mostly resistant to Erythromycin (46%), followed by Cefradine (42%), Sulphamethoxazole (34%), Clindamycin (32%), Amikacin (26%), Amoxycillin (16%), Meropenem (16%), Cefotaxime (14%), Piperacillin (14%), and Levofloxacin (0%). It is evident that *Salmonella* spp. isolated from houseflies are resistant to multiple antibiotics. *Salmonella* isolates circulating in our environment are posing a serious risk to human health. The spread of resistant *Salmonella* in the environment warrants further surveillance against other bacteria as well. Furthermore, it is mandatory to devise control measures against the vector.

Keywords: Salmonella, Houseflies, MDR, meat, Muzaffargarh

Antibacterial resistance of *Staphylococcus aureus* isolated from retail food products in China

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The advent of multidrug resistance among pathogenic bacteria is imperiling the worth of antibiotics, which have previously transformed medical sciences. Although high generation antibiotics are not legally prescribed for use in livestock or plant production, the occurrence of carbapenem-resistant *Enterobacteriaceae* (CRE), especially multi drug resistant strains *Enterobacteriaceae* has been increasingly reported in foods in the world. Here, for the first time, we characterized the prevalence of *S. aureus,* MRSA and NDM-producing *Escherichia coli* strains in China and Pakistan. A total of 1,150 *S. aureus* isolates were cultured from 27,000 retail foods items and were test for antimicrobial susceptibility. TIANamp Bacterial DNA extraction kit (DNA Kit DP302, Beijing, China) was used to extract the genomic DNA; PCR reactions were run and sequenced. Among 1,150 *S. aureus* isolates were isolated from raw meat, rice- and flour-products; vegetable salads; sandwich; meat and meat-products, eggs and egg-products; and 14 were isolated from 6 milk-products, condiments, bean-products and fruit desserts. 97.6% (1,122/1,150) of the *S. aureus* isolates exhibited resistance phenotypes to at least one antimicrobial agent. The highest levels of resistance were observed for penicillin (83.7%), followed by linezolid (67.7%) and erythromycin (52.1%), tetracycline (38.2%), and clindamycin (31%). Of the 1,150 *S. aureus* isolates, 91 isolates (7.9%) were identified as MRSA positive. In detail, 7.2% of raw meats, 10% of rice- and flour-products, 1.2% of vegetable salads, 7.2% of sandwiches, 6.5% of meat and meat-products, 32.6% of eggs and egg-products, were positive with *mecA*, respectively. Meanwhile, the enterotoxin genes were also amplified. Our study found a relatively low prevalence of *S. aureus* but the high prevalence rates of MDRSA and enterotoxigenic *S. Aureus* could cause severe outbreaks.

Keyword: Staphylococcus aureus, Retail foods, antimicrobial resistance, prevalence

Recent perspectives of meat quality evaluation techniques

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ABSTRACT

Meat quality and safety have significant importance for the meat industry as these are directly related to human health. Consumers prefer meat that is safe; has better taste and nutritional profile. Therefore, recently, the demand for reliable and industrial applicable meat quality evaluation techniques has been increased. Physical appearance and structural quality of the meat could be determined by evaluating meat color, marbling score, water holding capacity, dark firm dry (DFD), pale soft exudative (PSE), collagen organization, myofibrillar density, diameter, spacing, etc. Carcass quality and meat traceability can be ensured through a computerized system that will minimize the risk of error due to human intervention. Food additives are commonly used for improving quality of the product. However, the use of food additives requires a strict food safety policy. Sensor-based techniques could be effectively applied on an industrial scale for the detection of meat freshness. Furthermore, NMR spectroscopy techniques can be used to differentiate the frozen-thawed meat. Now a day, the meat industry is showing great interest in sensory evaluation of the meat. Modern techniques such as electronic nose and electric tongue could be used to discriminate the sensory attributes such as smell and taste, respectively. Moreover, the challenge of the specific application of the modern meat evaluation techniques could be resolved through the integration of multiple techniques.

Keywords: Meat quality, meat safety, traceability, meat quality evaluation

A Unique Partnership between Veterinary Diagnostic Laboratories and large US Universities as a response to COVID 19

Joseph J. Bove
President of Advanced Technology Corp, USA

A review of how veterinary laboratories at large US universities became part of the backbone to reopening; surveillance; and contact tracing for COVID 19. Presentation includes key reasons for veterinary laboratory involvement; methodologies of data sharing between critical systems; dissemination of results; and integration with public health agencies. Additional insight will be provided on the evolution of business requirements and lessons learned from a data management perspective.

Co-existence of *bla*$_{NDM}$ and *mcr-1* producing *Escherichia coli* isolated from human, poultry and environment water from Pakistan – A One Health concern

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Emergence and spread of New Delhi metallo-β-lactamase (NDM) and *mcr-1* producing *Escherichia coli* is a serious "ONE HEALTH" threat around the globe particularly in developing countries like Pakistan. NDM producing bacteria showed resistance against multiple antibiotics. *mcr-1* is a novel plasmid-mediated gene conferring resistance to colistin which is considering a last resort to treat clinical infection caused by carbapenem resistant pathogens. The aim of the study was to determine the prevalence of both *bla*$_{NDM}$ and *mcr-1* producing *E. coli* in different settings. Methods: A 100 each poultry cloacal swabs, environmental water and human samples (blood, urine, pus) were collected from Faisalabad metropolitan. Samples were screened for NDM and *mcr-1* producing *E. coli* using colistin and meropenem (4µg/mL) containing MacConkey agar. Further, isolates were confirmed using UTI ChromoSelect agar and API 20E. Antibiogram and phenotypic confirmation of carbapenemase and metallo-β-lactamase was carried out as per CLSI 2018 guidelines. Molecular identification of *mcr-1*and NDM gene was performed by PCR. Of 100 poultry samples; 22 *E. coli* were positive for *mcr-1*. Of 100 water samples, 17 *E. coli* were NDM producers and 4 were positive for *mcr-1*. However, in human samples, 15 *E. coli* were NDM producer and none for positive for *mcr-1*. *E. coli* from poultry displayed 100% resistance to colistin, tetracycline and doxycycline and 31% to cefepime while 83% sensitive to meropenem. *E. coli* from water samples also displayed 100% resistance to β-lactam, β-lactam inhibitors followed by 88% to meropenem and 73% to ciprofloxacin while 90% to colistin. Moreover, NDM producing *E. coli* from human samples also displayed 100% resistance against β-lactam and inhibitors and 80% to levofloxacin moxifloxacin and all were sensitive to colistin. Dissemination of *bla*$_{NDM}$ and *mcr-1* producing *E. coli* from clinical, poultry and environmental water is a matter of great concern for both livestock and public health. A "One Health" approach is necessary to further explicate the variability of these high-risk genes.

Key Words: E. coli, NDM, mcr-1, One Health, AMR

Comparative Efficacy of Ivermectin, Doramectin And Moxidectin Against Sarcoptic *Mange* in Rabbits

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ABSTRACT

Sarcoptes scabiei is the second most commonly diagnosed mange mite in rabbits after the *Psoroptic cuniculi* (Ear mites) and is one of the cosmopolitan mange mites in rabbit that causes severe pruritis and contagious parasitic infestations. The mite, *Sarcoptes scabiei*, lives deep in the epidermis of animals. The current study was conducted on the rabbits to evaluate the comparative efficacy of ivermectin, doramectin and moxidectin against these mites. 30 client-owned rabbits were randomly selected and classified into three groups i.e. groups A, B and C. Rabbits in group A were treated with 1% Ivermectin solution @ 400 µg/kg subcutaneously at days 0, 7, 14, 21, and 28. Similarly rabbits in Groups B and C were respectively treated with 1% Doramectin solution @ 0.2 mg/kg and 1% Moxidectin solution, subcutaneously, at Days 0, 7, 14, 21 and 28. After 1% Ivermectin subcutaneous injection, all rabbits recovered at day 28 and showed 100% efficacy against *Sarcoptes scabiei*. The efficacy of Ivermectin was 60%, 70%, 90% and 100% at days 7, 14, 21 and 28 respectively. Doramectin and Moxidectin showed comparatively lesser efficacy as compared to Ivermectin. Weight gain was also comparatively better after Ivermectin administration, than after Doramectin or Moxidectin. Blood parameters (CBC, LFT and RFT) were also evaluated at Days 0 i.e. pre-treatment, and subsequently at Days 7, 14, 21 and 28, post- treatment. The results showed that all the drugs in the trials were safe for use in rabbits, as no pathological results were observed in any experimental animal. The current study suggests that locally available 1% Ivermectin injectable solution is safe and cheaper remedy as compared to the imported doramectin and moxidectin for treatment of Sarcoptic mange in rabbits at the prescribed dosage.

Key words: Ivermectin, Doramectin, Moxidectin, Sarcoptic mange, *Sarcoptes scabiei*, Rabbit, CBC, LFT, RFT

COVID-19 and emerging issues

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In late 2019, a pandemic disease named as COVID-19 appeared which spread from one human to other. This disease was first reported in Wuhan. As, this disease appeared it causes so many problems for human. The NSA (National aeronautics and space administration) and ESA (European space agency) declared that COVID-19, has also shown many problem for example, economically, commercially and also cause air pollution. These (NSA and ESA) have declared that air pollution has declared that air pollution has increased 30% more after and before corona virus. Different countries have declared that air pollution has increased for example,27% in china,26% in Germany,18% in france and when people inhale this polluted air, the very small polluting particles e.g PM(2.5)moves from lungs to blood and then blood vessels which then causes inflammation and severe oxidative stress. If we inhale both air pollution and infection with COVID-19 it causes heart disease, heart stroke and heart failure. The sanitizers used by people, frequent hand hygiene. Sanitizer, made up of isopropyle alcohol, hydrogen peroxide. When we use sanitizer at large amount it may cause hazardous effect on human. A researcher in America, has declared that massive use of sanitizer causes confusion, vomiting drowsiness, respiratory arrest, death, antimicrobial resistance and viral disease. The masks and gloves used for the protection of COVID-19, when we threw the mask and gloves on garbage, the layers of river carried these with them and cause a problem for ocean life. Moreover, the micro-organisms entangled and cause environmental issues. In addition, disinfection or killing agents is also a cause of pollution. The killing agents may cause hardening of water and diseases in human. These were the emerging issues of the environment due to CIVID-19.

Key words: corona virus, masks, sensitize, pollution, diseases

Impact of Lead on Liver and Kidney of Rabbit Doe: A Source of White Meat

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Abstract

Lead (Pb) is a ubiquitous heavy metal which is not of bio-importance. It is entered in the body of animals and humans passively and exert hazardous effects. The effects of Pb residues have been studies in red meat. The number of cardiac patients is increasing in Pakistan and they are suggested to use only white meat. Rabbit is an efficient source of white meat but dissemination of Pb residues in meat was not studied here in Pakistan. The present study was conducted to determine the accumulation of Pb residues in liver and kidney in experimentally intoxicated does along with serological tests of respected organs. The treatment group was served Pb @ 80 mg/kg body weight as 0.2% solution daily for 30 days. The Pb residues were significantly higher ($P<0.05$) than control group doe but values of ALT, AST, urea and creatinine in both groups were non-significant. It was concluded that the does did not showed changes in serum tests at given dose of Pb and were resistant. Further studies are required to investigate the maximum permissible limits of Pb in rabbit and its effects on consumers.

Key words: Lead, doe, rabbit, serum

Tolerance of Cattle Against Environmental Heavy Metal Residues in Contaminated Area in Jhang, Pakistan

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Abstract

The toxicity of heavy metals is increasing at regular basis due to increase in inclinations of industrialization and urbanization. Dangerous effects of Pb and Cd have been studied in many countries of the world. They cause toxicity to liver, CNS and kidney. They are mutagenic, carcinogenic and nephrotoxic for animals and humans. Contaminated water and forage are the major sources of heavy metal accumulation in animals and are excreted in meat and milk. The occurrence of Pb and Cd in products of plants, drinking water, waste water and products of animals have been studied in various parts of country which could be a hazard for public and animal health. The regulations for the industrial runoffs and household wastes are deprived in Pakistan. Assessment of permissible levels of toxic metals is yet needed to be standardized in animal and animal products. This study demonstrated the Pb and Cd residues in serum of cattle and effects on blood and serum parameters. The values in a contaminated area were compared with a clean area at 95% confidence level. Our findings suggested higher metal levels in contaminated area but the blood and serum parameters were statistically non-significant. This study is helpful to formulate the safe limits of metals in animals and their transmission in animal products for public.

Key Words: heavy metals, cattle, environment, blood.

Survey on Risk Perceptions, Knowledge, And Behavior Related to Ticks and Tick Infestation Among Livestock Owners in Punjab, Pakistan

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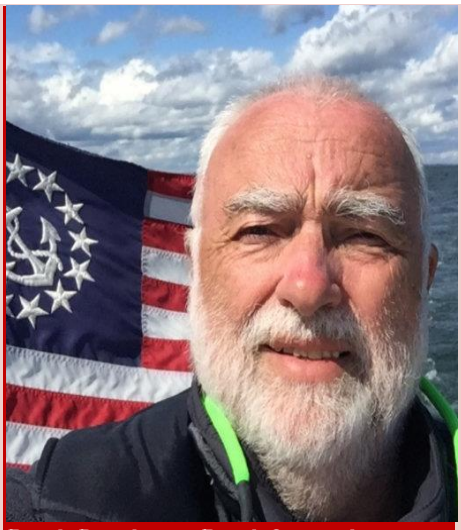
Introduction:

Recent global changes have led to an increase in the spread of ticks and tick-borne diseases (TBDs) affecting domestic ruminants and humans. Tick- and tick-borne diseases cause 13.9 to 18.7 US billion loss annually around the globe. Our study focused on the assessment of major loops in perceptions and practices of livestock farmers regarding the tick infestation in their animal, which are contributing to increase TBDs. Keeping this in view, we designed a study and selected 96 livestock farms (having up to 20 animals) in six districts of Punjab, Pakistan, and a well-structured questionnaire was organized among the owners. Of the 96 livestock owners, 71.9% (n=69) kept cattle, buffalo, sheep, and goats together, and 38.5 % (n=37) did not consider tick infestation as a health-related issue. Almost 29.1 % (n=28) were unaware of acaricidal use against ticks in their animals. Only 18.8 % (n=18) were consulting veterinarians regarding tick infestation for their animals. Our study highlighted the association between livestock owner's consultation with veterinarians and appropriate acaricidal use on their farm (P =0.003). Most of the respondents, 66.7 % (n=64), were practicing manual tick removal (i.e. with bare hands). Our study found a significant association between tick-bites and manual tick removal as a result of this high-risky practice (P=0.012). Our study highlighted that lack of awareness and the unrecognized health-related issue of tick-infestation among livestock owners. These issues cause a high level of disease burden and economic loss, also increasing the possibility of zoonotic TBD transmission. An integrated approach is required for the control of TBD, particularly those of zoonotic concern.

Keywords: Tick-infestation, Livestock, TBDs, Zoonosis, On Health

INTERNATIONAL PRESENTERS



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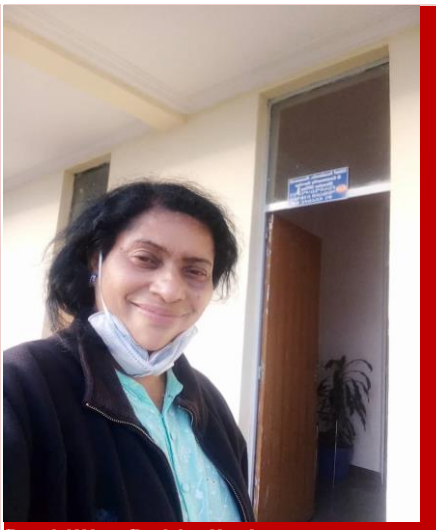

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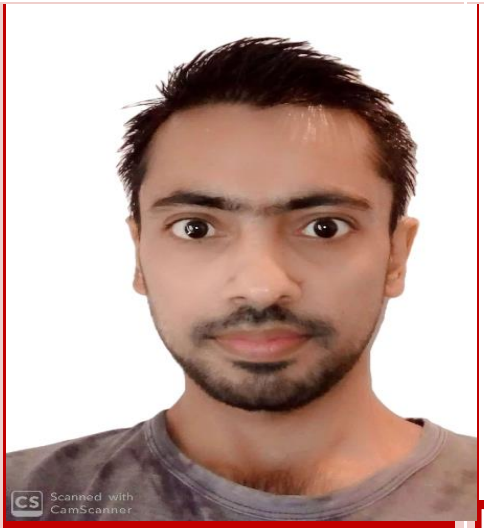

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Co-existence of *bla*$_{NDM}$ and *mcr-1* producing *Escherichia coli* isolated from human, poultry and environment water from Pakistan – A One Health concern

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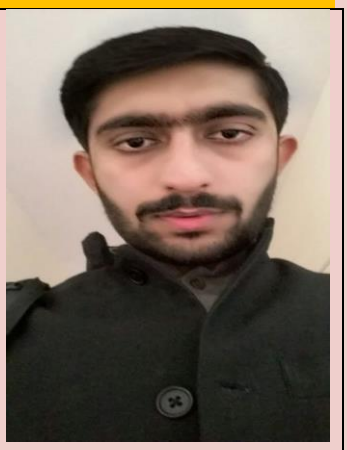

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Mr. Haroon Akhtar
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3rd Position

Ms. Mehtab Zahra,
University of Jhang, Pakistan

Recommendations:

The following recommendations have been based on the conclusions of the One-Health Conference (VIOHC 2020) both during the meeting and in a follow-up session.

- There is constant evidence that guidelines on empirical antibiotic use did not routinely consider resistance in their recommendations. Decision-makers should analyze and report the extent of local resistance patterns in the shape of antibiotic prescribing guidelines on empirical antibiotics.

- The top infections identified through the scientific presentations during the conference were identified as e.g. *Pseudomonas Spp., Salmonella enterica, E. coli, Staphylococcus aureus, Acinetobacter baumannii, Klebsiella pneumoniae, Campylobacter jejuni,* and various tick-borne protozoans.

- Veterinary Laboratories have a critical role in human surveillance. Emergency Vet. /Human Collaboration protocols should be established and strengthened ahead of the next outbreak.

- Universities have great potential for health surveillance if goals and policies have been established.

- Post vaccine policy planning needs to be started now. e.g. for travel purposes, quarantine, etc.

- Plan and hold Antimicrobial Stewardships in the country. Involving enthusiastic students to the effort within and outside of the health professions will help assure sustainability for future generations.

- Implementation of the One-Health approach at subnational administrative levels and combating funding deficiencies for One-Health research.

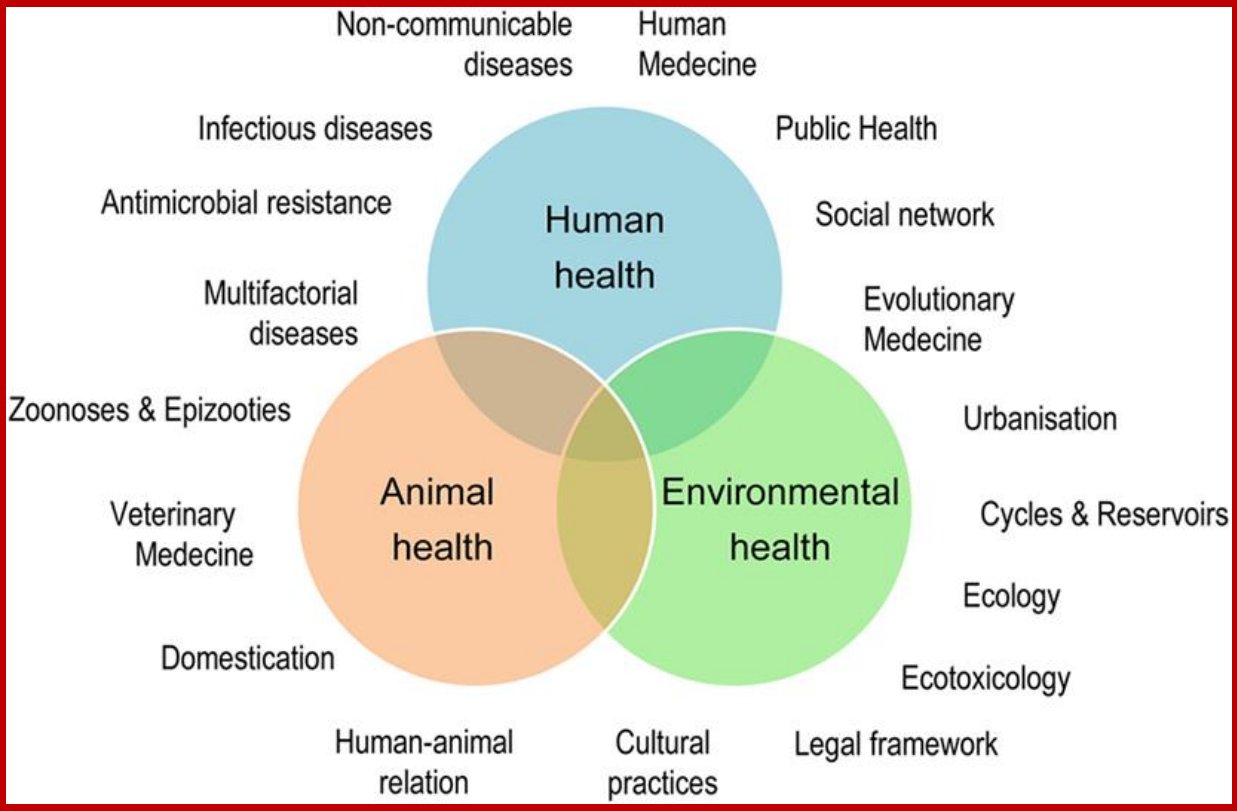
- Inform, engage, and solicit the support of scientists, epidemiologists, veterinarians, public health officials, nurses, community health workers, students, and I.T. specialists to find solutions to global disease surveillance and offer a platform to test and scale up innovations in health.

- Establish workgroups liaisons of experts and key supporters to promote the One-Health research and support its principles.

We wish you to join us in supporting the One-Health Initiative based on scientific evidence.

Two days Virtual One Health Conference (OHC) : Postcovid-19 Prospective

November 25-26, 2020



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