

9th INTERNATIONAL SCIENTIFIC CONFERENCE

13 -16 February 2024

Ras Sedr, South Sinai-EGYPT

Green Sudr
RESORT



ONE WORLD ONE HEALTH

A new era of veterinary medicine
in sustainable development

ABSTRACT BOOK



Food and Agriculture
Organization of the
United Nations



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EVA PHARMA
ANIMAL HEALTH

IUBS



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MSD
Animal Health

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NAGY AWAD
GROUP



VACCINE
VALLEY



الدواجن
الوطنية

AL WATANIA POULTRY



Life Tech

**9th INTERNATIONAL
SCIENTIFIC CONFERENCE**
13-16 February 2024 **Green Sudr
RESORT**
Ras Sedr, South Sinai-EGYPT



NE WORLD **ONE HEALTH**

A **new era** of veterinary medicine
in **sustainable development**



Conference Chairman

Prof. Dr. Iman B. Shaheed

Dean of Faculty of Veterinary Medicine
Cairo University



General Secretary

Prof. Dr. Haitham M. Amer

Vice Dean of Graduate Studies & Scientific
Research – Faculty of Veterinary Medicine,
Cairo University



Acknowledgment

Special thanks and kind acknowledgment to members of the organizing and scientific committees for their distinguished and unlimited efforts that enabled this event to be completed.

Organizing Committee:

- Prof. Dr. Fayez Salib
- Prof. Dr. Wafaa Abd El-Ghany
- Prof. Dr. Ahmed Samir
- Prof. Dr. Ayman Tolba
- Dr. Mohamed Shaalan
- Dr. Gazal Nabil
- Dr. Manar Magdy
- Dr. Omar Sayed
- Dr. Mahmoud Fawzy
- Dr. Ahmed Khattab

Scientific Committee:

- Prof. Dr. Jakeen El-Jaky
- Prof. Dr. Ashraf Abou-Seida
- Prof. Dr. Khaled Abd El-Moein
- Prof. Dr. Elham Hassan
- Prof. Dr. Manal Zaki
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SCIENTIFIC CONFERENCE
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ONE WORLD
ONE HEALTH
A new era of veterinary medicine
in sustainable development

PROGRAM AT A GLANCE

DAY 01

13-2

Time

Activity

17:00 - 19:00

Registration & receiving conference bag

DAY 02

14-2

Time

Activity

09:00 - 09:15

Introduction & Welcome

9:15 - 10:15

One Health - Panel Discussion

10:30 - 11:45

Session 1 (One Health and role of Veterinary Medicine)

12:00 - 13:45

Session 2 (Climate change and the future of livestock & aquaculture)

13:45 - 14:30

Coffee Break - Poster Session

14:30 - 16:30

Session 3 (Online keynote lectures)

16:30 - 17:30

Session 4 (Animal wealth: development and sustainability)

17:30 - 18:30

Special topics 1

18:30 - 20:00

Workshop on Veterinary Education (Meeting Room 2)

DAY 03

15-2

Time

Activity

09:00 - 10:45

Session 5 (Alternative therapies: Promoting healing & wellness in animals)

11:00 - 12:45

Session 6 (Modern technologies in Veterinary Diagnostic Approaches/modalities)

12:45 - 13:45

Special topics 2

13:45 - 14:30

Coffee Break - Poster Session

14:30 - 16:00

Session 7 (online keynote lectures)

16:00 - 17:45

Session 8 (Day One Competences in Veterinary Medicine)

18:00 - 19:00

Closing Ceremony

Gumboro

Range Of Protection

**SOLID
PROTECTION...**
For IBD effective
control



zoetis

SCIENTIFIC PROGRAM

WEDNESDAY 14TH FEB. / 2024

Grand opening

Time

Activity

9:00

Conference Chairman Welcome Speech (Iman Shaheed; Dean of Faculty of Veterinary Medicine, Cairo University).

9:10

Video on Faculty of Veterinary Medicine, Cairo University.

9:15

One Health - Panel Discussion Session

Interlocutor: Haitham M. Amer

Members: (Mohamed Faisal - Hafez M. Hafez - Ann van Soom -

Mohamed A. Shalaby - Parminder S. Basran - Fernando Rodriguez)

Session 1 (One Health & role of Veterinary Medicine) - Chairpersons: Michael Hess - Parminder Basran - Mohamed Shalaby

Time

Activity

10:30

Keynote lecture:

Vaccination against selected poultry pathogens to support One Health.

Michael Hess

11:00

Keynote lecture:

The One Health Paradigm and AI in Veterinary Medicine.

Parminder S. Basran

11:30

The Relation Between One Health and Vaccination Concepts.

Maged M. Ibrahim

Session 2 (Climate change & the future of livestock & aquaculture) - Chairpersons: Mohamed Faisal - Dušan Palić - Adel Shahin

Time

Activity

12:00

Keynote lecture:

Sustaining the Aquatic World in the One Health Era

Mohamed Faisal

12:30

Keynote lecture:

Aquatic Veterinarians Role in Achieving Global Goals through One Health: Healthy Fish for Healthy People.

Dušan Palić

SCIENTIFIC PROGRAM

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Dušan Palić

SCIENTIFIC PROGRAM

WEDNESDAY **14TH FEB. /2024**

Session 2 (Climate change & the future of livestock & aquaculture) - Chairpersons: Mohamed Faisal - Dušan Palić - Adel Shahin

Time	Activity
13:00	Shrimp and One Health: pros and cons. <u>Amel El-Asely</u>
13:15	Silver nanoparticles (Ag NPs) and Zinc oxide nanoparticles (ZnO NPs) for Aquaculture Drainage Water Remediation: Efficient alternative for traditional remediation processes. <u>Mahmoud Abou-Okada, Mona Saleh, Mansour El-Matbouli</u>
13:30	Dietary selenium nanoparticles (SeNPs) modulate Nile tilapia intestinal performance and microbiome. <u>Eman Zahran, Bei Wang, Kwaku Amoah, Samia Elbahnaswy, Fatma Ahmed, Omar Abdel-Hamed, Ahmed Farid, Engy Risha, Mahmoud El Sebaei, Lina Abdel-Hafez</u>

Session 3 (Online keynote lectures) - Chairpersons: Manal Zaki - Wafaa Abdel Ghany

Time	Activity
14:30	Fish vaccination by needle-free innovation nano-vaccines. <u>Rodkhum Channarong</u>
15:00	Systems biology provides opportunities and challenges for the understanding of host pathogen interactions. <u>Falko Steinbach</u>
15:30	How much climate change must be in climate change education? <u>Craig Stephen</u>
16:00	Protecting the Health of Humans, Domestic and Wild Animals, and Ecosystems Through the Integration of Veterinary Medicine with Data Science. <u>Brenda Hanley</u>

SCIENTIFIC PROGRAM

WEDNESDAY **14TH FEB. /2024**

Session 4 (Animal wealth: development and sustainability) - Chairpersons: Ann Van Soom – Fayed Salib

Time	Activity
16:30	Keynote lecture: Assisted reproduction in cattle and horses: a global perspective. <u>Ann van Soom, Katrien Smits</u>
17:00	Speed of embryo development is associated with maternal age in equine OPU-ICSI. <u>Mohamed Hedia, Nele Leenders, Klaartje Broothaers, Andrea Fernández-Montoro, Daniel Angel-Velez, Ellen Polfliet, Emma Van den Branden, Sofie Peere, Jan Govaere, Ann Van Soom, Jo Leroy, Katrien Smits</u>
17:15	Impact of Defaunation on Physical Examination, Bodyweight, Feed Intake and Rumen Protozoal, Biochemical and Histo-Anatomical Compositions in Native-breed Goats. <u>Mahmoud Saber, Hisham A. Abdelrahman, Eman Rashad Ramadn Sary, Meray N. Ramsis, Sabry A. Mousa</u>

Special Topics 1

Time	Activity
17:30	International Union of Biological Sciences (IUBS): Unifying biology through diversity (IUBS). <u>Moemen Hanafy</u>
17:45	The role of specialized media in raising awareness on one health. <u>Atef Soliman</u>
18:00	One Health, A Zoetis Vision <u>Beshoy Adel</u>
18:15	Eva pharma capabilities <u>Hala Mohamed</u>



Work shop

Time	Activity
18:30	Workshop on Veterinary Education (Meeting Room-2)

SCIENTIFIC PROGRAM

WEDNESDAY **14TH FEB. / 2024**

Poster Session

Time

Activity

13:45 - 14:30

P1 Investigation of Antibiotic Resistance Pattern and Virulence Determinants in Avian Pathogenic Escherichia coli Isolated from Broiler Chickens in Egypt.

Basma M. Hamed, Mona I. Elenbaawy, Hossam Mahmoud, and Eman Ragab

P2 Impact of host and risk exposures on the prevalence of resistance in Enterobacteriaceae: the case of humans and broilers in the West Region of Cameroon.

Jude F. Leinyuy, Karimo. O, Innocent M. Ali, Christiane. T, Georges F. Kuh, Djomgoue G. Ngangoum, Gustave. S, Christopher B. Tume

P3 Investigation of silver nanoparticles role as a sustainable solution to reduce development of multidrug-resistant salmonellosis in small ruminants.

Manar M Farouk, Amal El-Molla, Fayez A Salib, Yousef A Soliman, Mohamed Shaalan

P4 Prevalence, isolation, serodiagnosis, and treatment of Contagious Pustular Dermatitis in Sheep and Goats in Egypt, 2023.

Christine A. Mikhael, Fayez A. Salib

P5 Management of ischemia-reperfusion in rat models of different ages and documentation of age-related changes in renal aging and oxidative biomarkers.

Mahdi Bozorgnia, Diana Vavrincová-Yaghi, Peter Vavrínek

P6 A preclinical study focusing on oxidative stress parameters on adjuvant arthritis rat model to evaluate the effect of various molecular weights of hyaluronic acid in monotherapy and in combination with methotrexate.

Sasan Khademnemato lahi, Katarína Pružinská, Silvester Poništ, Karol Švík, Jana muchová, Katarína Bauerová

P7 Dietary supplementation with the probiotic Sanolife® PRO-F protects the Nile Tilapia Oreochromis niloticus during thermal stress.

Samia Elbahnaswy, Gehad E. Elshopakey, Mai El-Son

SCIENTIFIC PROGRAM

WEDNESDAY **14TH FEB. / 2024**

Poster Session

Time

Activity

14:15 - 15:00

P8 Bacterial Co-Infection as a Potential Threat to Farmed Flathead Grey Mullet (*Mugil cephalus*): Phenotypic and Molecular Diagnosis, Histopathology, Immunity Response, and In Vitro Antibacterial Evaluation.

Samia Elbahnaswy, Gehad Elshopakey, Medhat Shakweer, Elsayed Eldessouki, Abdelwahab Abdelwarith, Elsayed Younis, Simon Davies, Mai El-Son

P9 Serological Immune Response of Multivalent Inactivated Avian Influenza Vaccines in Commercial Broiler and Broiler Breeder Chickens.

Dina Moustafa, Ausama Yousif, Abdelrahman Ismail, Shourok Aly, Mohammed Saeed, Kamal Zidan, Mohamed Adel, Badawy Elsayed, Mahmoud Ibrahim

P10 Study of some udder characters and sonography for Mesopotamian buffalo in middle of Iraq.

Taif Mustafa, Garabed Baghdasar, Saif Al-Aameri, Jabbar Al-Saedy, Khalid Al-Fartosi

SCIENTIFIC PROGRAM

THURSDAY **15TH FEB. / 2024**

Session 5 (Alternative therapies: Promoting healing and wellness in animals) - Chairpersons: Ho Jae Han - Haitham Amer - Samir Nasif

Time	Activity
09:00	Keynote lecture: Reactive oxygen species (ROS) and neurodegenerative diseases. <u>Ho Jae Han</u>
09:30	Combined laser-activated SVF and PRP remodeled spinal sclerosis via activation of Olig-2, MBP and neurotrophic factors and inhibition of BAX and GFAP. <u>Mariam Farid, Noha Yasin, Asmaa Al-Mokaddem, Marwa Ibrahim, Yara Abouelela, Hamdy rizk</u>
09:45	Ameliorative effect of selenium loaded chitosan nanoparticles on brain, ovary, and liver of adult female albino rats exposed to silver nanoparticles. <u>Omnia Shalaby, Yasmine Ahmed, Aya Mekkawy, Mohamed Mahmoud, Heba Khalil, Gehad Elbargeesy</u>
10:00	Recovery of Recombinant Avian Paramyxovirus Type-3 Strain Wisconsin by Reverse Genetics and Its Evaluation as a Vaccine Vector for Chickens. <u>Mohamed Elbehairy, Sunil K. Khattar, Siba Samal</u>
10:15	Characterization of Velogenic Newcastle Disease Virus Genotype VII from Mallard Ducks Showing Nervous signs in Egypt. <u>Mahmoud Ibrahim, Mohamed Wahba, Aman-Allah El-Bahrawy, Nahed Yehia</u>
10:30	Recognition of adaptive mutations sites on PI structural protein of FMD SAT2 Sudanese vaccine strain. <u>Inas Habiballa, Raouf Alhaj, Sana Mohamed, Oubi. Salim, Essra Mustafa, Ahmed Alwahab, Mohammed Hassan</u>

Session 6 (Modern technologies in Veterinary Diagnosis) - Chairpersons: Fernando Rodriguez - Mona El Enbaawy - Sohair Sokkar

Time	Activity
11:00	Keynote lecture: Predictive Models for Food Safety and Quality: Past and Future Perspectives. <u>Fernando Rodriguez</u>

SCIENTIFIC PROGRAM

THURSDAY **15TH FEB. / 2024**

Approaches/modalities) - Chairpersons: Fernando Rodriguez — Mona El Enbaawy - Sohair Sokkar

Time	Activity
11:30	Multifactorial investigation of staphylococcal enterotoxins in marinated Chicken Shawarma at static and dynamic temperature profiles. <u>Shaimaa Ahmed</u> , <u>Araceli Bolívar</u> , <u>Cristina Díaz-Martínez</u> , <u>Silvia de la Cruz-Ares</u> , <u>Heba Abdel-Naeem</u> , <u>Gehan Kassem</u> , <u>Fernando Pérez-Rodríguez</u>
11:45	Unraveling the Complex Interplay of Microenvironment, Cage Position, and Disease in Laying Hen Productivity. <u>Mohammed A. Kamal</u> , <u>Mohamed Atef</u> , <u>Mahmoud A. Khalf</u> , <u>Zakia A.M. Ahmed</u>
12:00	Hydrophobic carbon quantum dots for production of antimicrobial coatings: Insights on their applications in the veterinary field. <u>Mohamed Shaalan</u> , <u>Mária Kováčová</u> , <u>Zdenko Špitálský</u>
12:15	Aspergillus fumigatus' gliA, gliP, and gliZ genes edited using CRISPR/CAS9 system. <u>Rida Zainab</u> , <u>Arsh Mukhtar</u> , <u>Zakia Saleem</u> , <u>Haiba Kaul</u> , <u>Ali Ahmad Sheikh</u> , <u>Muhammad Bilal Bin Majeed</u>
12:30	Novel insights into avian pathogenic Escherichia coli pathogenesis and host response using bioluminescent imaging. <u>Mohamed Kamal Abdelhamid</u> , <u>Claudia Hess</u> , <u>Ivana Bilic</u> , <u>Martin Glösmann</u> , <u>Hammad Ur Rehman</u> , <u>Dieter Liebhart</u> , <u>Surya Paudel</u> , <u>Michael Hess</u>

Special Topics 2

Time	Activity
12:45	International Journal of Veterinary Science & Medicine: History and Future Perspectives <u>Hala Zaher</u>
13:00	Microbial lysozyme as antibiotics adjuvant. <u>Ahmed Orabi</u>
13:15	Sphereon and sustainability. <u>Mohamed Amer</u>
13:30	Vaccine Technology Localization in MENA for Vaccine Security and Globalization (MEVAC). <u>MEVAC STAFF</u>



SCIENTIFIC PROGRAM

THURSDAY **15TH FEB. / 2024**

Session 7 (Online keynote lectures) - Chairpersons: Iman Shahid - Hussein Omar

Time	Activity
14:30	Broken gut, ruined livestock health and performance: how to stop this vicious circle? <u>Qendrim Zebeli</u>
15:00	When food safety and sustainability intersect: Academic and industrial opportunities. <u>Ahmed Yousef</u>
15:30	Advancements in Precise Diagnosis: Integrating Digital Pathology and Artificial Intelligence. <u>Ayman El-Baz</u>

Session 8 (Day One Competences in Veterinary Medicine) - Chairpersons: Hafez M. Hafez - Claudia Hess - Mahmoud Eltholth

Time	Activity
16:00	Keynote lecture: Influence of COVID-19 on poultry production <u>Hafez M. Hafez</u>
16:30	Salmonella Monitoring in European poultry production: Prevalence, Epidemiology and Detection. <u>Claudia Hess</u>
17:00	An International Network of Veterinary Education for Sustainable Antimicrobial Use and Tackling Antimicrobial Resistance (NetVet4SAMU). <u>Mahmoud Eltholth, Jennifer Cole, Mehmet Cemal Adiguzel</u>
17:15	Guidelines and Regulations for the establishment and functioning of Institutional Animal Care and Use Committees in Egypt. <u>Abeer Badr</u>
17:30	Hyalomma dromedarii Leucine aminopeptidase: Potential role in Tick Control. <u>Esraa Ali, Nahla Hussein, Amr El-Hakim, Mahmoud Amer, Yasser E. Shahein</u>

SCIENTIFIC PROGRAM

THURSDAY **15TH FEB. / 2024**

Closing ceremony

Time

Activity

18:00

Signing MOU between Faculty of Veterinary Medicine, Cairo University and College of Veterinary Medicine, Seoul National University.

18:15

Recommendations

18:30

Awards distribution

18:45

Closing speech and Group Photo

Poster Session

Time

Activity

13:45 - 14:30

P11 Expression of a transgene in-frame with a Newcastle disease virus protein increases the transgene expression and stability.
Mohamed Elbehairy, Siba Samal, George Belov

P12 Auricular cartilage regeneration using different types of mesenchymal stem cells in rabbits.
Taghreed Hassan, Maher MA, Amr El Karmoty, Zainab Sabry, Marwa Ibrahim, Hamdy Rizk, Ayman Tolba

P13 Effect of Horsetail (Equisetum arvense) Leaves Extract on Cystitis and Struvite Calculi Involved in Feline Lower Urinary Tract Disease.
Mahmoud Saber, Mohamed Elkhayat, Sabry Mousa, Fady A. Youssef, Hisham Abdelrahman, Fayez Salib

P14 Compare the Efficacy of Corneal Healing Between Autologous Serum and Eye drops Platelet Rich Plasma in Dogs.
Shaaban Gadallah, Tarek Misk, Alaa Ghaith, Eslam Reda, Anis Anis

P15 The potential ameliorative effect of melatonin to Aluminum oxide nanoparticles toxicity in brain tissue and spinal cord of adult male albino rats.
Nermeen Abdelhameed, Yasmine Ahmed, Noha Yasin, Mohamed Mahmoud, Mohamed El-Sakhawy

SCIENTIFIC PROGRAM

THURSDAY **15TH FEB. /2024**

Poster Session

Time

Activity

13:45 - 14:30

P16 Influence of Sambong (Blumea Balsamifera) Leaves Extract on Cystitis and Amorphous Urates Causing Feline Lower Urinary Tract Disease.

Mahmoud Saber, Mohamed Elkhayat, Sabry Mousa, Fady Youssef, Hisham Abdelrahman, Fayez Salib

P17 Residual contamination and biofilm formation by Gram negative bacteria in poultry houses isolated from drinking water systems, fans, and floors.

Aya Ibrahim, Hanan khalefa, Sherief Mubarak

P18 Cysticercus bovis-induced Liver Lesions in Slaughtered Beef Cattle Imported from Sudan.

Mohamed Hesham, Mohamed Youssef, Sary K. Abdel Chaffar, Salwa Abdel Rahman

P19 Effect of the microglial purinergic receptor P2Y12 on the efficiency of beta-amyloid immunotherapy.

Amr A. Gabr, Annett Halle

P20 Polyphasic characterization of an emerging Vibrio harveyi strain associated with mortalities in European Seabass (Dicentrarchus Labrax) farm in Alexandria, Egypt.

Jehan, I. Abdellatif, Soad Sabry A. Salama, Mahmoud Mabrok



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“A New Perspective of Animal Health.”

We are EVA Pharma Animal health, driven by passion & Innovation to enhance animal health & welfare with highly advanced reliable solution to sustain the health, food & companionship for humanity.

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KEYNOTE SPEAKERS

(ACCORDING TO THE PRESENTATION SCHEDULE)

KEYNOTE SPEAKERS

(ACCORDING TO THE PRESENTATION SCHEDULE)




MICHAEL HESS
University of veterinary
medicine
Vienna – Austria




MOHAMED FAISAL
Michigan State
University, USA




HAFEZ M. HAFEZ
Free University of
Berlin, Germany




DUŠAN PALIC
Ludwig-Maximilians
University, Munich,
Germany




HO JAE HAN
Seoul National
University, South Korea




ANN VAN SOOM
University of Ghent
Belgium




FERNANDO PEREZ
University of Cordoba
Spain




CLAUDIA HESS
University of veterinary
medicine
Vienna – Austria




**PARAMINDER
BASRAN**
Cornell University, USA

MICHAEL HESS



Prof. Michael Hess received his degrees from Free University in Berlin after which he joined R&D at Intervet, UK. In 2001 he joined the University of Veterinary Medicine, in Vienna, where he established a poultry clinic with research, diagnostic services and teaching.

Since 2008 he is also heading the Department for Farm Animals and Veterinary Public Health. He has a strong interest in poultry health, the development of new protection strategies and diagnostic tools.

He is a member of different scientific associations and editorial boards. He was a founder diplomate and first president of the European College of Poultry Veterinary Science (ECPVS). He published more than 240 peer-reviewed manuscripts, holds various patents and is a member of several scientific committees and editorial boards.

He was awarded with the Robert Fraser Gordon Memorial Medal of the Gordon Memorial Trust in UK, a Doctor Honoris Causa of the Pannonian University in Hungary, the title Bene merito pro Facultate Medicinae Veterinariae in Varsovia, University of Life Sciences, Warsaw, Poland and in 2023 he was inducted into the Hall of Honor of the World Veterinary Poultry Association (WVPA).

PARAMINDER S. BASRAN



Parminder Basran, Ph.D., is an Associate Research Professor and Medical Physicist at Cornell College of Veterinary Medicine, providing research, education, and clinical support.

He is passionate about sharing knowledge of what medical physicists do with the public and improving global access to cancer care.

Dr. Basran leads the VAIDER Lab: Veterinary Artificial Intelligence in Diagnostic Imaging and Radiotherapy, investigating AI's use in livestock and companion animals, along with novel uses of radiotherapy within the veterinary setting. He also serves in provincial, national, and international professional societies, including Medical Physics for World Benefit and the American Association of Physicists in Medicine as Chair of the Working Group on Veterinary Radiation Oncology.

MOHAMED FAISAL



Prof. Mohamed Faisal is a professor of aquatic animal medicine at the Department of Pathobiology and Diagnostic Investigation of the Michigan State University (MSU)-College of Veterinary Medicine and the Department of Fisheries & Wildlife of MSU-College of Agriculture and Natural Resources.

Dr. Faisal joined MSU in March of 2001 and prior to that he was a professor at the School of Marine Science, The College of William and Mary, Virginia, USA. He received his doctoral degrees from the University of Ludwig-Maximilian, Munich, Germany. As a veterinarian, he devoted his career to the study of diseases affecting aquatic animals (both freshwater and Marine). In specific, he is interested in deciphering the mechanisms of the pathogen-host interactions; how the pathogens invade its host and overcoming its immune system and how the host reacts and combat the intruding microbes. Over a career that extended 37 years, Professor Faisal has made several milestone discoveries that advanced his field of specialization. During his relatively short tenure at MSU, he was successful in establishing the Aquatic Animal Medicine Program that integrated MSU, Michigan Department of Natural Resources, Michigan Department of Agriculture, and the Great Lakes Fishery Commission.

MOHAMED FAISAL



Dr. Faisal's research enabled him to develop several important tools that facilitated the diagnosis of emerging infections and finding promising targets for the biological control of invasive species. He is instrumental in providing guidance to the Great Lakes states on how to manage their fishery resources in the presence of emerging pathogens.

At the international level, Dr. Faisal is the Lead Scientist and Co-Founder of the Living Oceans Foundation, which is undertaking important research to mitigate the effects of diseases on coral reef biodiversity. He is also on the International Pollution Responses in Marine Organisms Association and is Consultant to the Secretary General of the UN on pollution issues. He established a central laboratory for fish disease diagnosis in Senegal 2008.

Dr. Faisal has been recognized by a number of national and international awards and honorary degrees. For his outstanding research serving the community of Aquatic Animal health for several decades, Dr. Faisal has been selected as SF Snieszko Distinguished Fellow and Professor. Most recently, Dr. Mohamed Faisal has received the 2015 Jack Christie/Ken Loftus Award for his contribution toward understanding healthy great lakes ecosystems.

DUŠAN PALIĆ



Professor Palić comes from a long line of veterinarians & educators, being the third generation Professor of Veterinary Medicine.

He received D.V.M. and MVSc degrees from Faculty of Veterinary Medicine in Belgrade, Serbia, and Ph.D. from Iowa State University College of Veterinary Medicine, where he worked as assistant professor until he accepted invitation to LMU Munich and took over the Chair for Fish Diseases in 2012.

Dušan is a founding member, certified aquatic veterinarian (CertAqV), and Past President of World Aquatic Veterinary Medical Association (www.wavma.org). He is a founding diplomate and former Vice-President of European College of Aquatic Animal Health (ECAAH, www.ecaah.org), and the Director of the International Aquatic Veterinary Biosecurity Consortium (IAVBC, www.-iavbc.org). As senior expert in aquatic animal health for Food and Agriculture Organization of United Nations, Prof. Palić has spent significant time in the Kingdom of Saudi Arabia working on preparation of the National Aquatic Animal Health Strategy and Action Plan for KSA. Dušan was a representative of academia and organized aquatic veterinary profession in the FishMedPlus Coalition that was established by Federation of Veterinarians of Europe (FVE) upon request from European Medicine Agency (EMA), with the goal to improve access and availability of veterinary medical products, including vaccines, to the E.U. aquaculture industry.

DUŠAN PALIĆ



He was an expert member in WG3 Farm Management for preparation of “Partnership for Animal Health and Welfare (PAHW)”, for Horizon Europe and an aquaculture expert on World Veterinary Association project for the development of essential medicines lists. On the global veterinary education front, Prof. Palić is member of the project team that is developing a model curriculum for day-1 competency in aquatic veterinary medicine.

His daily work as Chair for Fish Diseases at LMU Munich includes research, teaching, diagnostic, and extension services. As world aquaculture is steadily growing and overtaking terrestrial protein production, it is becoming clear that sustainable and safe use of water resources must be achieved to support The Global Goals and provide safe and affordable food for increased human population. What recent history taught us is that such global expansion of aquaculture is prone to catastrophic crashes due to emerging and re-emerging diseases. Overuse of antibiotics with and without veterinary supervision poses a serious problem to human health as multi-drug resistance is increasing. Lack of educated veterinary workforce to support industry growth is further widening the service/demand gap. All of the above comes together in one health approach, in which major pillar is identified to be disease prevention, control and possible eradication through biosecurity approaches that are in accordance with international standards and national legislations. As one of the invited speakers, Dušan will provide insight on current disease challenges in marine environment using a recent example of mass mortality of Noble Pen Shell in the Mediterranean, and open a discussion about how to approach sustainable and safe increase in aquatic ecosystems resources use.

ANN VAN SOOM



Ann Van Soom graduated in 1988 as DVM at the faculty of Veterinary Medicine, Ghent University, Belgium, and obtained a PhD on the development of bovine embryos in 1996. She has been employed at Ghent university since 1990. At present, she holds a position as full professor at the department of Reproduction, Obstetrics and Herd Health, Faculty of Veterinary Medicine, Ghent University, and is also Head of Department.

She has been teaching assisted reproduction in domestic species, small animal reproduction and obstetrics to the veterinary students for almost 20 years now. She is a diplomat of the European College of Animal Reproduction (ECAR) since 1999, and has been a member of the EVSSAR and the IETS for many years. She has been elected as a governor for IETS in 2007 and in 2013. She was member and Chair of the HASAC (Health and Safety Advisory Committee) Research subcommittee of IETS for about ten years. She was chair of the COST Action Epiconcept FA1201 from 2012–2016, and is a member of the EU-ITN network RepBiotech. She is also serving in national and international advisory committees on sanitary risks involved with assisted reproduction in domestic species, and has been authoring a chapter in the 4th edition of the IETS Manual dealing with these problems. She is supervising a group of about 10 PhD students and three postdocs working together on embryonic development and semen quality in different model species, like horses, cattle, cats, dogs and pigs. She has published more than 200 peer reviewed papers listed in WoS, h-index =37. Her clinical activities are related to small animal reproduction, with an emphasis on semen collection, gamete cryopreservation and artificial insemination in cats and dogs. She is also visiting catteries and dog breeding facilities which are experiencing breeding problems. She is offering advice for applying new methods of contraception and oestrus induction in dogs and cats to practicing veterinarians, as well as giving advice in small animal obstetrics.

FERNANDO PEREZ



Fernando Perez Rodriguez undertook his degrees in Biological Science and in Food Science and Technology from the University of Córdoba in 1999 and 2002, respectively. He completed his PhD from the University of Córdoba (2007), which dealt with quantitative microbiological risk assessment and cross contamination in foods.

He has published over 120 peer-reviewed papers, book chapters, and books concerning predictive microbiology, quantitative risk assessment, and nutrition in foods. He has been involved in several research projects at the national and international levels, conducting quantitative risk assessment studies and investigating the dynamics of microbial ecology in food systems. Fernando is the leading manager and designer of the online risk assessment supporting tool “MicroHibro” intended to perform probabilistic microbial risk assessments and has actively participated in the development of the tool “Baselineapp” for sampling plans. Due to his expertise, he has participated as a scientific advisor in several expert panels at national and international levels, in the Spanish Food Safety Agency and as a Risk Assessment Expert of the European Food Safety Authority (EFSA) and FAO providing scientific advice and reports. Currently, He serves as a scientific expert in the roster of the joint FAO/WHO expert meeting on Microbiological Risk Assessment (JEMRA). In addition, he is a member of the International Association of Food Protection and the Spanish Society of Microbiology.

HAFEZ MOHAMED HAFEZ



University Prof. Dr. Hafez was head of the Institute of Poultry Diseases of the Free University in Berlin from October 1st 1997 until 31st October 2016. He is currently Gust “senior” Professor at the same Institute. Dr. Hafez is Veterinary Poultry Specialist, Veterinary Microbiology Specialist and Veterinary Animal Hygiene Specialist.

He is Diplomat of European College of Veterinary Public health (Dipl. ECVPH) and Diplomat of European College of Poultry Veterinary Science (Dipl. ECPVS). In addition, he is an honour Professor at the University of Hohenheim, Germany since 1996 as well as honour Professor at the Alexandria University, Egypt since 2009. Since 2015, he is advisor of the Arab Federation for Food Industries (AFFI). He is currently Honorary President of the World Veterinary Poultry Association (WVPA). From 2007 –2011 he was the President of the WVPA. From 2011–2015 he was of the Vice –(Past)–president of the WVPA. Furthermore, he is Chairman of Poultry Scientific Committee of the German Veterinary Chamber, Past-Chairman of the German Branch of the World Veterinary Poultry Association and Chairman Working group 10 (Turkey) European Branch of World Poultry Science Association (WPSA). Hafez's research interest focused on poultry diseases diagnosis and control in general and food borne diseases, management, animal welfare and hygiene.

CLAUDIA HESS



Senior Lecturer in Poultry Diseases strongly involved in undergraduate and post-graduate (residency candidates of the ECPVS, doctorate and PHD candidates) teaching activities. The focus is to provide students with a profound knowledge in Poultry Medicine, Poultry Diseases, and diagnostics.

Diagnostic activities involve clinical practices, necropsies of different poultry species, diagnostics (parasitology, bacteriology, serology, histology, molecular biology, virology). Providing reports and offering consultancy to colleagues, farmers and owners of backyard poultry is also part of this working area. The diagnostic laboratory of the Clinic is accredited according to ISO 17025. Research focuses mainly on bacterial infections in poultry. Special interest: host-pathogen interaction, establishing new diagnostic tools. Within this working area animal experiments are also conducted.



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ONLINE KEYNOTE SPEAKERS
(ACCORDING TO THE PRESENTATION SCHEDULE)

ONLINE KEYNOTE SPEAKERS

(ACCORDING TO THE PRESENTATION SCHEDULE)



FALKO STEINBACH

University of Surrey,
UK



AHMED YOUSEF

The Ohio State
University,
USA



CRAIG STEPHEN

University of British
Columbia, Canada



QENDRIM ZEBELI

University of Veteri-
nary Medicine, Vienna,
Austria



**CHANNARONG
RODKHUM**

Chulalongkorn
University, Thailand



AYMAN EL-BAZ

University of Louisville,
Kentucky, USA



BRENDA HANLEY

Cornell University,
USA

CHANNARONG RODKHUM



Channarong Rodkhum currently work at the Department of Microbiology and Fish Infectious Diseases Research Unit (FID RU), Faculty of Veterinary Science, Chulalongkorn University.

Dr. Channarong's research is emphasized on fish infectious diseases especially bacterial pathogens of fish such as *Streptococcus* spp., *Flavobacterium columnare*, *Flavobacterium indicum*, *Taenecibaculum* spp., *Franciscella noatunensis* subsp. *orientalis*, *Aeromonas hydrophilla* and *Aeromonas veronii*. The current project is "Development of vaccine for potentially used for prevention of bacterial diseases outbreaks in Tilapia and Asian Sea bass".



FALKO STEINBACH



Falko Steinbach studied Veterinary Medicine at the Free University in Berlin. He then continued his post-graduate training by qualifying for a German DVM/PhD and PD in Virology and Immunology.

Since 2005 he is Head of the Mammalian Virology Group at the now APHA in Weybridge, UK and since 2014 also Professor of Veterinary Immunology at the newly established School of Vet Medicine at the University of Surrey in Guildford, UK. In 2012 he was appointed to the Veterinary Advisory Council of the Horserace Betting Levy Board (HBLB) and since 2013 is a named OIE expert for Equine Viral Arteritis. He was the founding Chair of the European Veterinary Immunology Group (EVIG) and has published over 100 peer-reviewed publications. He is a member of Journal Editorial Boards, such as TBED, Frontiers Immunol. Vaccines. His research interests are host-pathogen interaction, new & emerging diseases. His focus is Dendritic cells (DCs) and how these orchestrate the immune response

CRAIG STEPHEN



Dr. Craig Stephen is one of Canada's leading One Health professionals. He has devoted his career to developing ideas, people, policies, and evidence to concurrently promote the health of people and animals and their shared environments.

Craig is the Director of the McEachran Institute, a Canadian think tank dedicated to future-readying animal health professionals. He is a Clinical Professor at the School of Population and Public Health (University of British Columbia) and a Clinical Professor at the Ross University School of Veterinary Medicine.



BRENDA HANLEY



Jointly trained in geography and land studies, mathematics, statistics, and computational biology, I am a Research Associate in the Department of Public and Ecosystem Health at the College of Veterinary Medicine at Cornell University.

I apply my quantitative knowledge to diverse teams of health professionals to develop the mathematical and statistical tools needed to answer urgent One Health questions at the interface between veterinary science and ecosystem-scale health.



QENDRIM ZEBELI



A Full Professor of Animal Nutrition and Director of the Institute of Animal Nutrition and Functional Plant Compounds at the University of Veterinary Medicine Vienna.

Prof. Zebeli serves also as the Head of the Christian-Doppler-Laboratory for Innovative Gut Health Concepts in Livestock (CDL-LiveGUT). Qendrim has a veterinary degree, a M.Sc. in Animal Production, and holds a PhD and an advanced PhD ("Habilitation") in the field of Animal Nutrition and Feed Science. Qendrim has an extensive experience in the successful management of multidisciplinary and international research projects with main research stays abroad in Germany, the Netherlands, Spain, Italy, and Canada. Prof. Zebeli has authored more than 230 peer-reviewed papers. His main research interests are in the interface of nutritional physiology and health of ruminants with particular emphasis of gastrointestinal health in dairy cattle.

AHMED YOUSEF



Department of Food Science and Technology, established the largest ozone research laboratory in the United States, housed at Ohio State. Focusing on the effect of ozone applications,

Dr. Yousef has developed ozone-based processes for pasteurizing the shell of an egg and other innovations that have led to enhanced safety of processed foods. Additionally, Yousef's research birthed the discovery of three new antimicrobial agents: Paenibacillin, Paenibacterin, and Brevibacillin. When Dr. Yousef is not researching, his attention lies within the classroom, teaching the main food microbiology courses at Ohio State. Through his impact in teaching and researching, Dr. Yousef has received many awards, including the College of Food, Agricultural and Environmental Science's Innovator of the Year, Educator of the Year (Ohio Association for Food Protection), and the Research and Development Award.

AYMAN EL-BAZ



A distinguished academic, currently holds the positions of Professor, Distinguished University Scholar, and Chair of the Bioengineering Department at the University of Louisville, Kentucky. His academic journey commenced with the completion of his bachelor's and master's degrees in electrical engineering in 1997 and 2001, respectively.

It began in 2009 when he was bestowed with the title of Coulter Fellow in recognition of his substantial contributions to biomedical translational research. His remarkable achievements continued to gain prominence, leading to his appointment as an American Institute for Medical and Biological Engineering (AIMBE) Fellow in 2018, celebrating his exceptional accomplishments in the realm of medical imaging and his exemplary leadership in education, scholarship, and service within the field of bioengineering. In 2020, Dr. El-Baz earned the prestigious distinction of being named a National Academy of Inventors (NAI) Fellow, the first from the Middle East, in acknowledgment of his groundbreaking work in Artificial Intelligence (AI) and Medical Imaging (MI). The year 2022 witnessed his recognition as a Biomedical Engineering Society Fellow, honoring his invaluable contributions to the field of Biomedical Engineering and his inspirational leadership within the Biomedical Engineering Society.

AYMAN EL-BAZ



Notably, in 2017, the Biomedical Engineering Society entrusted Dr. El-Baz with the role of an ABET program evaluator, reflecting his standing as an authority in the field. Dr. El-Baz boasts an impressive 23 years of hands-on experience in the areas of bio-imaging modeling, big data, artificial intelligence, and non-invasive computer-assisted diagnosis systems.

As a Principal Investigator (PI) and Co-Investigator (Co-I), he has successfully secured 50 grants totaling \$29.0 million from esteemed sponsors such as NIH, DOD, NSF, and the American Cancer Society. His scholarly contributions are equally prolific, with 50 books, 250 papers in prestigious high-impact journals, 300 papers in extremely selective peer-reviewed conferences within his field, 300 abstracts, 50 patents, 2 software licensing technologies, 7 software copyrights, 2 tutorials, and 50 invited talks to his credit. Dr. El-Baz's scholarly impact is evident through his impressive citation count of around 21,000, alongside a remarkable H-index of 70. His dedication to mentoring and advising is apparent, having guided and nurtured 29 students, culminating in the successful completion of 15 Ph.D. dissertations and 14 master's theses. His mentorship has yielded substantial recognition, with seven of his Ph.D. advisees earning the prestigious John M. Houchens dissertation awards. Additionally, Dr. El-Baz's research group has amassed a notable 189 national and international awards and travel scholarships, further underscoring his profound influence in the academic community.



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Session 1

ONE HEALTH AND ROLE OF VETERINARY MEDICINE

Wednesday 14 February 2024

10:30 – 11:45

VACCINATION AGAINST SELECTED POULTRY PATHOGENS TO SUPPORT ONE HEALTH

Michael Hess

University of Veterinary Medicine, Clinic for Poultry, Veterinärplatz
1, 1210 Vienna, Austria

michael.hess@vetmeduni.ac.at

In the actual presentation three different pathogens, fowl adenovirus, *Escherichia coli* and the parasite *Histomonas meleagridis* will be covered, to highlight the need for a sophisticated vaccination strategy. The (re-)emergence of those pathogens in recent years with very limited intervention strategies is a common characteristic for all of them.

Worldwide, diseases due to fowl adenovirus (FAdV) infections – inclusion body hepatitis (IBH), hepatitis-hydropericardium syndrome (HHS) and adenoviral gizzard erosion (AGE) – in broilers increased substantially in recent years. It can be hypothesized that the severe impact on health and the lack of specific therapeutics leads to the untargeted use of antimicrobials to minimize losses. Variation in strains representing different serotypes is a substantial challenge to develop a broadly protecting vaccine. As a consequence of strain diversity autogenous vaccines are widely used in chicken breeders and even broilers depending on the epidemiological situation. In recent years we developed subunit vaccines based on the fiber protein and very good efficacy was demonstrated experimentally. However, the lack of cross protection is a severe disadvantage, similar to whole virus killed vaccines. As a new concept we developed chimeric fibers consisting of 2 different serotypes fulfilling the demand of a broad-based vaccine.

Escherichia coli is frequently isolated from healthy birds, but avian pathogenic strains are able to induce colibacillosis, a global problem in poultry production. *E. coli* is probably the most extensively studied organism in poultry and a substantial number of publications show the high interest on the pathogen within the international scientific community, especially in the field of poultry health.

VACCINATION AGAINST SELECTED POULTRY PATHOGENS TO SUPPORT ONE HEALTH

Michael Hess

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However, due to the zoonotic potential of some strains research on *E. coli* is also of interest for a wider community and together with the frequent use of antimicrobials to minimize suffering of animals and losses an important One Health issue. The substantial variation of strains together with the need for mass application via the respiratory tract is a substantial challenge for vaccine development. We have recently implemented radiation technology to inactivate live bacteria but at the same time being able to induce immunity. In experimental animal trials the efficacy of such a concept was demonstrated opening a new option for vaccine development against this highly important pathogen.

The protozoan parasite *Histomonas meleagridis* is the etiological agent of histomonosis (syn. Blackhead disease), a fastidious disease in turkeys which can lead to the complete loss of a flock. The disease is also of increasing importance in chickens, mainly broiler breeder and layers. With the recent ban of all prophylactic and therapeutic substances in the EU and the US the disease is a serious problem on welfare and health of animals. Albeit Paramomycin, an aminoglycoside antibiotic, has certain effects when given prophylactically it was shown in an experimental study that the application triggers antimicrobial resistance in the gut microbiota with consequences on One Health. The complicated nature of the parasite and its dependence on the presence of live bacteria for growth in vitro is a severe obstacle to develop a vaccine. In the last 2 decades we not only succeeded in establishing a clonal culture of a virulent strain which we attenuated in vitro, we also developed the concept of a single bacterial strain-parasite culture (syn. monoxenic culture).

VACCINATION AGAINST SELECTED POULTRY PATHOGENS TO SUPPORT ONE HEALTH

Michael Hess

University of Veterinary Medicine, Clinic for Poultry, Veterinärplatz
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Although efficacy and safety data support the idea to prevent histomonosis by vaccination, the low tenacity of the parasite with consequences on the vaccination technology are substantial challenges which remain to be solved.

Overall, the pathogens mentioned above, including viruses, bacteria and a parasite, underline the need to develop new vaccines for (re-)emerging poultry diseases which are characterized by the restricted availability of licensed therapeutics or vaccines, if available at all. All of them are of increasing importance in poultry production with severe consequences on health and welfare. Histomonosis is also a good example how legislation and the ban of drugs severely impacts health and welfare of animals. The frequent antimicrobial intervention for some of the pathogens targeted in the actual presentation highlights the importance of them in the One Health concept.

Selected recent references about the pathogens listed above and addressed in the presentation:

Fowl adenovirus infections

Schachner, A., Matos, M., Grafl, B. and M. Hess (2018). Fowl adenovirus-induced diseases and strategies for their control – a review on the current global situation. Avian Pathol. 47, 111-126,

<http://dx.doi.org/10.1080/03079457.2017.1385724>

THE ONE HEALTH PARADIGM AND AI IN VETERINARY MEDICINE

Parminder S. Basran

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The convergence of veterinary medicine, One Health principles, and artificial intelligence (AI) holds promise for advancing global healthcare. Veterinary medicine armed with AI has the potential to revolutionize disease surveillance, diagnosis, and treatment. With real-time data analysis and pattern recognition, AI can empower veterinarians and researchers to detect zoonotic diseases, monitor animal health trends, and forecast potential outbreaks, thereby mitigating health risks at the human-animal-environment interface. In this presentation, we will explore how AI can be leveraged in the One Health domain, examine the ethical considerations and challenges surrounding the adoption of AI in veterinary medicine, and describe best practices for adopting AI in the healthcare setting. Incorporating AI with the One Health paradigm offers endless opportunities for advancing veterinary medicine. While not a panacea, AI provides opportunities to improve the quality of life of animals and the people who care for them.

THE RELATION BETWEEN ONE HEALTH AND VACCINATION CONCEPTS

Maged M. Ibrahim

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The goal of this study is to evaluate the extent of nucleotide variation in isolated samples from 2017 to 2019 at the genetic level and Amino acid analysis of the N and P genes to earlier isolates from various areas in Egypt and the vaccine strains employed at this period. From 2017 to 2019, 10 brain tissues from probable rabies cases in the governorates of Dakahleya, Alexandria, and Beheira were checked for rabies. Three of them were picked to have their N and P genes partially sequenced further. The 3 isolates have quite a great level of similarity with previously Egyptian isolates, isolates from adjacent bordering countries, at the N and P gene level. This indicates that probably most of Egyptian circulating Rabies virus are of the same origin. They bear little resemblance to the vaccine strains at the level of P gene in comparison to N gene. AA analysis of P protein for Dakahleya isolate showed the lowest resemblance with the other two studied isolates (that having great similarity with each other.) On the other hand, they showed resemblance at the level of P gene analysis with the studied vaccinal strains. As the N and P genes are involved in Rabies virus pathogenicity as they facilitate the pathogenicity of the RABV G gene. So our Dakahleya and Wadi isolates may be varied in their pathogenicity. On the other hand, as the rabies binding of virus phosphoprotein (P5) to the BECN1 ring affects the replication for RABV through initiating incomplete autophagy that is dependent mostly on BECN1 signaling pathway, Antiviral medicines against RABV could use this as a target. So more in-depth research on such genes is needed for its control.

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Session 2

CLIMATE CHANGE AND THE FUTURE OF AQUACULTURE

Wednesday 14 February 2024

12:00 – 13:45

SUSTAINING THE AQUATIC WORLD IN THE ONE HEALTH ERA

Mohamed Faisal

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Since the “One Health” concept started to dominate the thinking processes of scientists, managers, and politicians from the early 2000s, realization of the importance of ecosystem health in the wellbeing of humans and animals steadily rose. Despite the increasingly alarming effects of climatic changes on the planet ecosystem, many milestone achievements were made in the terrestrial world. Unfortunately, the aquatic world received negligible attention despite its paramount importance to the existence of all creatures living on earth. While military conflicts, political instability, unprecedented economic crisis, and emergence of pandemics may be blamed for the lack of action to conserve the aquatic world, the magnitude of the underwater problems proved to be far superior to our ability to stop or slow down the demise, not to mention to conserve and restore the declining biodiversity. We simply lack the resources and needed expertise. As a result, today, more than ever, we need to strictly adhere to the main principles of “One Health” namely, communication, coordination, collaboration, and capacity building.

One of the signs of the ailing global aquatic productivity is the steady decline in fisheries harvest that are expected to stop providing seafood by the Year 2050, a matter that led to an increased dependance on aquaculture to fill the gap. As a result, aquaculture became one of the fastest growing and highly traded food sectors globally. As it currently stands, aquaculture fulfilled many of the 17 goals listed in the United Nations “2030 Agenda for Sustainable Development” adopted by all member states.

SUSTAINING THE AQUATIC WORLD IN THE ONE HEALTH ERA

Mohamed Faisal

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Despite the tremendous success of aquaculture in decreasing the shortage in fisheries harvest and alleviating poverty, there are numerous sustainability challenges that need to be addressed under the One Health umbrella. For example, mass mortalities have been observed over a wide range of farmed and wild aquatic animals, including fish, mollusks, crustaceans, harbor seals, manatees, turtles, frogs, coral organisms, and urchins. These mortality episodes have been associated with infection with either microbes that were never described before or pathogens moving from terrestrial to aquatic systems such as toxoplasmosis in sea otters, aspergillosis in sea fans, and caliciviruses in sea mammals. The antibiotic overuse in some aquaculture facilities associated with a surge in antimicrobial resistance came to the forefront as a major threat of aquaculture sustainability. These rising problems in aquaculture can only be addressed under the practical framework of “One Health” which calls for multisectoral and transdisciplinary approach to achieve beneficial health outcomes for people, non-human organisms, and their shared environment. Examples of potential solutions are discussed.

AQUATIC VETERINARIANS' ROLE IN ACHIEVING GLOBAL GOALS THROUGH ONE HEALTH: HEALTHY FISH FOR HEALTHY PEOPLE

Dušan Palić

Chair for Fish Diseases and Fishereis Biology, Faculty of Veterinary Medicine, Ludwig-Maximilians-University Munich, Kaulbachstr. 37, 80539 Munich, Germany
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Increase of global aquaculture output fulfills a significant portion of animal protein needs of growing human population. It is now clear that sustainable and safe use of ocean resources must be achieved to support global goals to provide safe and affordable food for more people. What recent history taught us is that such global expansion of aquaculture is prone to catastrophic crashes due to emerging and re-emerging diseases. Overuse of antibiotics with and without veterinary supervision poses a serious problem to human health as multi-drug resistance is increasing. All the above comes together in the one health approach, in which major pillar is identified to be disease prevention, control and possible eradication. We can achieve this through biosecurity approaches that are in accordance with international standards and National legislations, and with utilization of veterinary workforce. Dr Palić will provide insights on how aquatic veterinary biosecurity could contribute to sustainable and safe increase of aquaculture resource uses.

Development of effective, practical, and economically viable approaches to prevent, control and potentially eradicate infectious and contagious diseases in aquaculture operations, have eluded those involved in farmed aquatic animals for some time. Meeting these objectives using sound scientific veterinary principles outlined in the World Organization for Animal Health standards and elsewhere, is an overarching goal of the International Aquatic Veterinary Biosecurity Consortium (IAVBC). Solution that should meet the needs of producers and governmental regulatory agencies was developed over a number of years with input from a wide variety of collaborators from around the world.

AQUATIC VETERINARIANS' ROLE IN ACHIEVING GLOBAL GOALS THROUGH ONE HEALTH: HEALTHY FISH FOR HEALTHY PEOPLE

Dušan Palić

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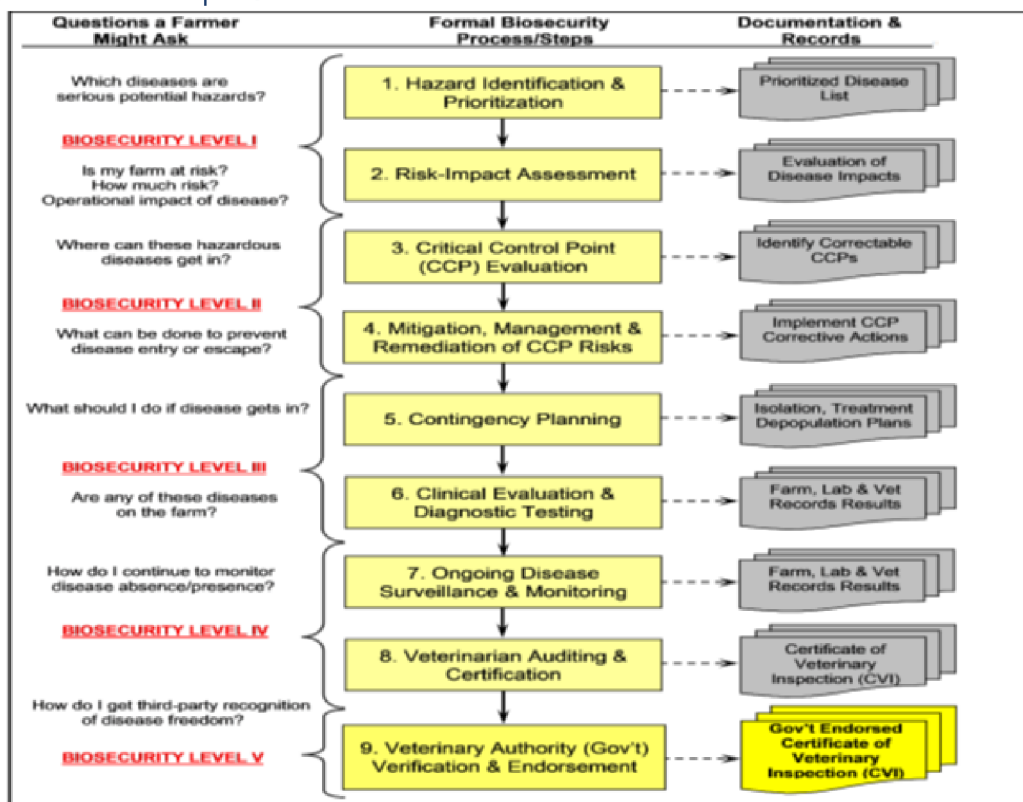
The IAVBC approach focuses on applying several important core WOA (OIE) processes targeted at determining and maintaining disease freedom on any epidemiological unit (EpiUnit) – from an individual farm, to a whole country (Fig. 1). More recently, international organizations and standard setting bodies are utilizing these approaches in development of “Progressive Management Pathway” concept (FAO) and addition of the Biosecurity chapter to the Aquatic Animal Health Code (WOAH, 2022). The processes include: identifying and assessing the risk and prioritizing hazardous diseases important to a clearly defined EpiUnit; identifying and correcting critical points where these diseases might enter or leave the EpiUnit; developing contingency plans should a disease be discovered in the EpiUnit through disease surveillance and monitoring; periodic auditing the EpiUnit biosecurity programs and records; and, as necessary, certifying the absence of these diseases in the EpiUnit, with governmental agency oversight and endorsement. The primary objective of this presentation is therefore to introduce the audience to key concepts that can help prevent, control and eradicate infectious and contagious diseases in aquaculture on any epidemiological unit – what we refer to as biosecurity.

AQUATIC VETERINARIANS' ROLE IN ACHIEVING GLOBAL GOALS THROUGH ONE HEALTH: HEALTHY FISH FOR HEALTHY PEOPLE

Dušan Palić

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Figure 1. Simplified processes and procedures, developed by the International Aquatic Veterinary Biosecurity Consortium, for developing and implementing biosecurity programs on any epidemiologic unit¹ (from a farm to a country) based on key activities outline in the WOAH Aquatic Animal Code and Manual.



¹ Epidemiologic Unit—a defined population of animals, separated to some degree from other populations, in which infectious and contagious diseases can be transmitted.

SHRIMP AND ONE HEALTH: PROS AND CONS

Amel M. El Asely*, Adel A. Shaheen

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Background: Shrimp aquaculture has experienced fast growth due to the high demand for shrimp worldwide. The estimated value of the global shrimp market in 2022 was USD 68.40 billion, and it is expected to experience a compound annual growth rate (CAGR) of 5.5% from 2023 to 2030. Shrimp has a low-calorie count and high protein content, making it an excellent source of nutrition. Additionally, there are several nutritional benefits, including an abundance of vitamins, minerals, and omega-3 fatty acids. The possibilities for local communities to gain benefits from shrimp farming are among the advantages of shrimp aquaculture. Multiple ecological consequences exist, such as increased soil salinity, soil and water pollution, disease outbreaks, public health risks, destruction of mangroves, loss of biodiversity, and local environmental changes. **Objectives:** In this article, the global relevance of shrimp farming is discussed, including its consequences for zoonotic diseases, the economy, the environment, and society more generally. In addition to this, it dives into the environmental impacts of shrimp farming, discussing the root causes as well as proposed solutions to mitigate the negative consequences.

Conclusion: Sustainable shrimp aquaculture necessitates the implementation of techniques that ensure the long-term economic sustainability, ecological integrity, and social responsibility of shrimp farming. It also requires adopting measures to alleviate the environmental and social impacts associated with shrimp farming.

Keywords: antimicrobial resistance (AMR); Shrimp culture; shrimp diseases; Sustainability.

SILVER NANOPARTICLES (AG NPS) AND ZINC OXIDE NANOPARTICLES (ZNO NPS) FOR AQUACULTURE DRAINAGE WATER REMEDIATION: EFFICIENT ALTERNATIVE FOR TRADITIONAL REMEDIATION PROCESSES

Mahmoud Abou-Okada^{1,2*}, Mona Saleh², Mansour El-Matbouli²

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²Division of Fish Health, University of Veterinary Medicine, 1210 Vienna, Austria.

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Background: The One Health approach is particularly relevant for food and water safety, nutrition, the control of zoonoses, pollution management, and combatting antimicrobial resistance. A sustainable ecosystem (life below water) is one of the sustainable development goals (SDGs) of the United Nations. Nano-remediation is an alternative to traditional remediation processes used for the complete remediation of contaminants from the aquatic environment.

Objectives: Application of silver nanoparticles (Ag NPs) or Zinc oxide nanoparticles (ZnO NPs) either singly or in combination as nano-remediation of aqua-cultured drainage water. **Methods:** Aqua-cultured drainage water was collected and treated with different doses of nanomaterials. Water chemical parameters, microbiological loads, and dissolved nanomaterial concentrations were measured for 10 days post-treatment. This study was conducted in the division of Fish Health, University of Veterinary Medicine, Vienna, Austria.

Results: The average particle size of Ag NPs and ZnO NPs measured by Zetasizer and TEM are 100 nm and 202 nm, respectively, while the average zeta potential is -42.0 mv and 33.9 mv respectively. The UV-vis absorption spectrum shows an absorption band at 420 nm (Ag NPs) and at 378 nm (ZnO NPs). Silver nanoparticles (0.05 mg/L), Ag NPs-ZnO NPs nanoparticles combination (0.05 mg/L and 1 mg/L) and double doses of Ag NPs-ZnO NPs nanoparticles combination (0.1 mg/L and 2 mg/L) show significant decrease in aerobic plate count after 6 hours of treatment, while ZnO NPs and half doses of Ag NPs-ZnO NPs nanoparticles combination (0.025 mg/L and 0.5 mg/L) show non-significant decrease in aerobic plate count after 6 hours of treatment compared to control group.

SILVER NANOPARTICLES (AG NPS) AND ZINC OXIDE NANOPARTICLES (ZNO NPS) FOR AQUACULTURE DRAINAGE WATER REMEDIATION: EFFICIENT ALTERNATIVE FOR TRADITIONAL REMEDIATION PROCESSES

Mahmoud Abou-Okada^{1,2*}, Mona Saleh², Mansour El-Matbouli²

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In contrast, ZnO NPs and half doses of nanoparticles combination show decrease of noxious nitrogenous waste products (Ammonia, nitrite, and nitrate) compared to Ag NPs. After 10 days of treatment, dissolved silver and zinc concentrations were measured by ICP-OES. The concentration of dissolved silver ranged from 0.01 to 0.019 mg/L and dissolved zinc ranged from 0.506 to 0.974 mg/L which is lower than the permissible limit in water. Conclusion: Nano-remediation is considered a sustainable approach for treating drainage of aquacultured water.

Keywords: Nano-remediation; Nanomaterials; Ammonia; Aerobic plate count; Water treatment; Silver concentration.

DIETARY SILENIUM NANOPARTICLES (SENP) MODULATE NILE TILAPIA INTESTINAL PERFORMANCE AND MICROBIOME

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Background: Maintaining a healthy intestine is essential for the growth and host defense mechanisms of farmed fish, particularly those densely stocked. In this context, maintaining healthy intestinal microbiota for the proper functioning of fish intestines; particularly those involved in digestion, absorption, and integrity of the intestinal mucosa; is of utmost importance. SeNPs (Nano-form) enriched-Pediastrum boryanum (Turpin) exhibits antimicrobial, antioxidant, and antitumor properties. Therefore, SeNPs are considered valuable nutritional supplements for farmed aquatic animals.

DIETARY SILENIUM NANOPARTICLES (SENP) MODULATE NILE TILAPIA INTESTINAL PERFORMANCE AND MICROBIOME

Objectives: This study investigated the effect of dietary SeNPs on the composition of the gut microbiota; by increasing the dominance of beneficial bacteria and inhibiting the growth of pathogenic bacteria; with subsequent enhancement of normal physiological functions, such as growth, immune response, and oxidative defense mechanisms.

Methods: Algogenic Se nanoparticles (SeNPs; 79.26 nm) were synthesized from the green microalga *Pediastrum boryanum*. Nile tilapia (*Oreochromis niloticus*) basal diet was supplemented with 0.75, or 1.5 mg/kg dry feed of the SeNPs for 8 weeks. The growth and comprehensive arrays of intestinal parameters were investigated. Results: Feed supplementation with SeNPs, particularly at a 1.5 mg/Kg diet, improved the fish growth performance, amylase and lipase activity, intestinal morphometry, and acid mucin-producing goblet cell counts. In addition, SeNPs supplementation didn't alter the expression of the apoptosis-related genes. SeNPs at a 1.5 mg/Kg diet were observed to be the optimal dose, as they showed better results with respect to the increased count of beneficial microbes, and the decreased count of pathogenic microbes, demonstrating the potential role of SeNPs in growth improvement and intestinal immunity enhancement.

Conclusion: SeNPs feed supplementation can boost fish production and promote the sustainability of Nile tilapia aquaculture.

Keywords: Gene Expression; Gut Microbiota; Intestinal integrity; Nanoparticles; Tilapia.

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Session 3
ONLINE KEYNOTE LECTURES
Wednesday 14 February 2024
14:30 – 16:30

FISH VACCINATION BY NEEDLE-FREE INNOVATION NANO-VACCINES

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Infectious diseases are the major diseases which are now devastating the cultured fish worldwide. Among those diseases, bacterial disease is the major disease destroying the wide range of economical important cultured fish species. In order to reducing fish production loss from those diseases, the prevention strategies should be implemented. Vaccine is one of most effective solution using for infectious diseases prevention in fish. Fish can exhibit specific immune responses against infections by vaccination with effective vaccines. Most of the licensed fish vaccines are vaccines for injection. Although injection vaccination in cultured fish can provide many advantages, however, this method still has many disadvantages such as 1.) it is not appropriate for the early stage and small size of fish, 2.) fish required sedation or anesthesia before vaccination, 3.) fish may get infection by surrounding pathogens at the injection site, 4.) fish may get severe stress from injection, 5.) laborious method, 6.) many equipment needed, 7.) time-consuming, etc. Therefore, needle-free vaccination is a novel solution for fish vaccination which can provide many benefits for the prevention of infectious diseases in cultured fish. Our current research was mainly focused on the development of novel mucoadhesive nano-vaccines for immersion against fish bacterial infections such as *Flavobacterium oreochromis*, *Franciscella orientalis*, *Aeromonas veronii*. and *Streptococcus agalactiae*. The cationic nano-polymers were combined with the antigens preparing from sonicated formalin-killed bacterial cells.

FISH VACCINATION BY NEEDLE-FREE INNOVATION NANO-VACCINES

Channarong Rodkhum^{1,2}

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Various parameters of the nano-vaccines including transmission electron microscopy (TEM), physiochemical properties; zeta potential, and polydispersity index (PDI) were comprehensively characterized. The immunological and protective effects of the needle-free vaccination by the nano-vaccines were determined from in vivo study in the experimental fish species such as the relative percent survival (RPS) after challenging with pathogens, expression of immune-related genes by qPCR, histopathological changing, and antibody production by ELISA. The results revealed promising immunological and protective effects of the nano-vaccines which immersion vaccinated to the experimental fish species. Additionally, the nano-vaccine candidates have higher efficacies when compared to killed-whole cell by immersion vaccination. We also provide promising efficacy and feasibility of our nano-vaccines after immersion vaccinate to mass fish production at the commercial farming scale. Our research can be summarized that needle-free vaccination by nano-vaccines can create significant immunological and protective efficacies to culture-fish species against major fish bacterial diseases. Moreover, it can be easily and efficiently used in the mass fish production of the commercial scale-farming for prevention of harmful fish infectious diseases.

Keywords: needle-free innovation, nano vaccines, prevention, bacterial fish diseases.

SYSTEMS BIOLOGY PROVIDES OPPORTUNITIES AND CHALLENGES FOR THE UNDERSTANDING OF HOST PATHOGEN INTERACTIONS

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Systems Biology is slowly but steadily entering veterinary science. While this provides enormous opportunities for our understanding of host-pathogen interaction it also comes with new challenges. The aim of this presentation is to introduce systems biology in the context of recent studies that we carried out with the intention to highlight the opportunities as well as the challenges that arise as we move from studying individual markers (by flow cytometry, qPCR or ELISA for example) to large datasets (using methods such as RNASeq or scRNASeq).

HOW MUCH CLIMATE CHANGE MUST BE IN CLIMATE CHANGE EDUCATION?

Craig Stephen

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This presentation will reflect on educational circumstances that enable climate change and health learners to make tangible changes to protect health. It is no longer enough to explain things; one also had to change them. Transferable knowledge that will allow veterinarians to be effective at protecting health is needed in the face of climate change but focusing on climate change alone neglects the reality of the intertwined polycrisis we and all animals are facing. Unlocking the full potential of veterinarians to address existential threats requires a new narrative to help them implement collective action for collective problems. This talk will reflect on how climate change education can be launched now despite uncertainty, and different goals and understanding of the problem and identify transferrable learning outcome that are applicable across a suite of complex and existential problems. One of the signs of the ailing global aquatic productivity is the steady decline in fisheries harvest that are expected to stop providing seafood by the Year 2050, a matter that led to an increased dependence on aquaculture to fill the gap. As a result, aquaculture became one of the fastest growing and highly traded food sectors globally. As it currently stands, aquaculture fulfilled many of the 17 goals listed in the United Nations "2030 Agenda for Sustainable Development" adopted by all member states.

PROTECTING THE HEALTH OF HUMANS, DOMESTIC AND WILD ANIMALS, AND ECOSYSTEMS THROUGH THE INTEGRATION OF VETERINARY MEDICINE WITH DATA SCIENCE

Brenda Hanley

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There exist tremendous opportunities to convene interdisciplinary teams of animal health and data scientists to drive discoveries that benefit the well-being of humans, animals, and ecosystems. I will discuss data science techniques available to leverage historical veterinary data in the development of predictive tools depicting the risk of disease emergence and spread. I will then discuss additional avenues in which veterinarians can aid computational scientists in the production of data for inclusion in increasingly powerful mathematical models. Acting as the computational bridge among health fields, data scientists can support interdisciplinary teams of veterinarians, biologists, ecologists, and public health officials in our shared pursuit of knowledge surrounding unnumerable and important One Health topics.

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Session 4

ANIMAL WEALTH: DEVELOPMENT AND SUSTAINABILITY

Wednesday 14 February 2024
16:30 – 17:30

GLOBAL WARMING AND ASSISTED REPRODUCTION IN CATTLE AND HORSES

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Background: Assisted reproduction has become a routine procedure in cattle and horse breeding in Europe, but can it also be of use given global warming? Objectives: To assess whether assisted reproduction can be implemented to improve animal resistance against climate change or even lead to more sustainable animal breeding. Methods: Presentation of different levels of assisted reproduction in horses and cattle.

Results: Outcome of assisted breeding procedures in horses and cattle.

Conclusion: The application of assisted reproduction in combination with genetic analysis may be useful to improve the sustainability and performance of specific cattle and horse breeds.

Keywords: cattle breeding; genetic selection; horse breeding, in vitro fertilization.

SPEED OF EMBRYO DEVELOPMENT IS ASSOCIATED WITH MATERNAL AGE IN EQUINE OPU-ICSI

Mohamed Hedia^{1, 2, 3*}, Nele Leenders¹, Klaartje Broothaers¹, Andrea Fernándezo-Montoro¹, Daniel Angel-Velez^{1, 4}, Ellen Polfliet¹, Emma Van den Branden¹, Sofie Peere¹, Jan Govaere¹, Ann Van Soom¹, Jo L.M.R. Leroy³, Katrien Smits¹

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Background: Advanced maternal age has no significant effect on blastocyst rates after ICSI of oocytes derived from donor mares. Pregnancy and foaling rates after transfer of ICSI blastocysts are significantly associated with their speed of development, where the fast-growing ones have higher chances to produce alive foals. Several mare-related factors affect the success rate of OPU-ICSI, and little is known regarding the dynamics of embryo development. **Objectives:** This study retrospectively investigated the association between maternal age, oocyte developmental competence, and the speed of blastocyst development.

Methods: In total, 44 blastocyst-producing OPU-ICSI sessions were performed on Warmblood mares, aged 1-25 years old. Recovered oocytes were in vitro matured in TCM-199 Earl's salts (Gibco) containing 10% fetal bovine serum (FBS; Gibco), 9.4 µg/ml follicle-stimulating hormone, and 1.88 µg/ml luteinizing hormone (Stimufol®, Reprobiol) at 38.2 °C in 5% CO₂ for 28-32 h, or held in embryo holding media (Emcare®, Agtech) at room temperature for 17-24 h before maturation.

SPEED OF EMBRYO DEVELOPMENT IS ASSOCIATED WITH MATERNAL AGE IN EQUINE OPU-ICSI

Oocytes with a polar body were fertilized by piezo-drill ICSI. The presumptive zygotes were cultured in DMEM/F-12 (Gibco) with 10% FBS under oil (38.2°C, 5% O₂, 5% CO₂, and 90% N₂). Cleavage was evaluated 3 days after ICSI, and blastocyst formation was monitored daily from day 7 up to day 13. Spearman's correlation coefficients between OPU-ICSI outcome and maternal age were calculated. Results: The average numbers of aspirated follicles recovered oocytes (recovery rate), mature oocytes (maturation rate), cleaved presumptive zygotes (cleavage rate), and blastocysts (blastocyst rate) were 23.27 ± 1.66 , 15.16 ± 1.34 (65.12%), 9.27 ± 0.87 (61.22%), 6.19 ± 0.58 (69.58%), and 2.35 ± 0.32 (25.96%), respectively. Day of first blastocyst formation was negatively associated with the numbers of aspirated follicles ($r = -0.476$, $P = 0.001$), recovered oocytes ($r = -0.415$, $P = 0.005$), mature oocytes ($r = -0.617$, $P = 0.000$), cleaved zygotes ($r = -0.573$, $P = 0.000$), and blastocysts ($r = -0.759$, $P = 0.000$). There was also a negative association between the day of first blastocyst formation and maternal age ($r = -0.369$, $P = 0.016$).

Conclusion: Taken together, advanced maternal age is associated with an earlier blastocyst development in mares. Further follow-up is recommended to see whether these embryos of old donor mares will produce foals at equal rates as those of younger mares.

Keywords: embryo development; intracytoplasmic sperm injection; mares; maternal age; ovum pick-up.

IMPACT OF DEFAUNATION ON PHYSICAL EXAMINATION, BODYWEIGHT, FEED INTAKE AND RUMEN PROTOZOAL, BIOCHEMICAL AND HISTO-ANATOMICAL COMPOSITIONS IN NATIVE-BREED GOATS

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Background: The influence of defaunation (removing protozoa from the rumen) on health, rumen ecology, and body weight gain is still debated. Objectives: This study discussed the effect of sodium lauryl sulphate (SLS) and dioctyl sodium sulphosuccinate (DOSS), as defaunation agents, on physical examination, body weight, feed intake, and rumen ciliates, biochemical and histo-anatomical compositions in goats over 21 days

Methods: Ten clinically healthy female native-breed goats were assigned into two experimental groups; SLS and DOSS each one composed of 5 goats. The administration of both defaunation agents was carried out daily for the first three days of the experiment then once weekly for three consecutive weeks. Feed intake was estimated daily, while body weight and parameters of physical examination were measured weekly. The rumen fluid samples were collected before defaunation, 7-, 14-, and 21 days post defaunation. Samples of rumen papillae for histo-anatomical analyses were collected 21 post-defaunation and stained by Sirius red stain.

Results: Generally, defaunation had almost no effect on physical parameters except temperature and rumen motility which significantly decreased due to SLS and DOSS, respectively.

IMPACT OF DEFAUNATION ON PHYSICAL EXAMINATION, BODYWEIGHT, FEED INTAKE AND RUMEN PROTOZOAL, BIOCHEMICAL AND HISTO-ANATOMICAL COMPOSITIONS IN NATIVE-BREED GOATS

Bodyweight and daily feed intake revealed a significant decrease after defaunation by DOSS for 14 days. Rumen ciliates significantly decreased at time points of 7, 14, and 21 days due to SLS and completely disappeared due to DOSS after 21 days. Rumen ammonia nitrogen and rumen enzymes; gamma-glutamyl transferase and alanine aminotransferase decreased significantly in both groups. Grossly, both defaunation agents caused a dramatically negative effect on the length, density, and integrity of ruminal mucosa and ruminal papillae. SLS had more negative effects than DSS causing shortening, degeneration, and burning appearing on ruminal mucosa and ruminal papillae, especially at ruminal pillars. Histologically, DOSS revealed moderate alterations while SLS emphasized severe alterations that were shown by epithelial hyperplasia, infiltrations of inflammatory cells, increase in collagen fibers amount, as well as interstitial edema. Conclusion: Defaunation using DOSS or SLS negatively affects animal productivity and body weight gain. Due to its dramatic drawbacks, it is recommended not to administer DOSS as a surfactant for treating bloat or impaction, to maintain sustainable production in small ruminant flocks.

Keywords: bodyweight; Defaunation; dioctyl sodium sulphosuccinate; feed intake; rumen ciliates; rumen papillae

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Session 5

**ALTERNATIVE THERAPIES: PROMOTING
HEALING AND WELLNESS IN ANIMALS**

Thursday 15 February 2024

9:00 – 10:45

REACTIVE OXYGEN SPECIES (ROS) AND NEURODEGENERATIVE DISEASES

Ho Jae Han

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Reactive oxygen species (ROS) are unstable forms of oxygen molecules that occur during oxygen metabolism in cells. Uncontrolled high concentrations of ROS over a long period of time can lead to oxidative stress, which not only impairs cell function, but can also cause DNA damage, cell death, and more. We have shown that proper control of ROS through various natural phytochemicals enhances the activity and survival of stem cells, thereby increasing their therapeutic efficiency as cellular therapeutics. We have also elucidated the mechanisms of ROS-induced neurodegenerative diseases and cellular aging under conditions such as stress, diabetes, and obesity.

Natural phytochemicals exhibit a variety of physiological effects, and those with antioxidant capacity against ROS have improved stem cell survival and function. First, delphinidin, an anthocyanidin identified in pigmented fruits and flowers, inhibited JNK/NF- κ B signaling through its antioxidant action in an ischemic environment and simultaneously suppressed stem cell apoptosis by inducing the activity of the AKT protein. In addition, cyanidin, a natural organic compound, enhanced the proliferative capacity of hair follicle stem cells by reducing the endoplasmic reticulum-mitochondria contacts and mitochondrial calcium accumulation through its antioxidant activity.

REACTIVE OXYGEN SPECIES (ROS) AND NEURODEGENERATIVE DISEASES

O-cyclic phytosphingosine-1-phosphate (cP1P), a novel chemically synthesized sphingosine metabolite, promoted BICD1(bicaudal D homolog 1)-mediated nuclear translocation of HIF1 α (hypoxia-inducible factor1 α) through PKC α /AKT/mTORC1 pathway activation, thereby suppressing oxidative stress and apoptosis under hypoxia. Thus, the effective control of ROS-mediated oxidative damage through natural phytochemicals is expected to enhance the survival and engraftment of stem cells.

The brain is one of the most energy-consuming organs in the body, and as a result, the neuronal cells within the brain tissue are sensitive to ROS because they are actively metabolizing oxygen. We found that stress induces the accumulation of mitochondrial ROS and synaptic damage through NIX(NIP3-like protein X)-mediated inhibition of mitophagy. Additionally, in prenatal mice exposed to corticosterone, cognitive impairment caused by stress hormones was ameliorated by pretreatment with FGF2 (fibroblast growth factor 2), which led to the upregulation of neuroligin 1 expression and the transportation of GluR1/2(glutamate receptor1/2) to post-synaptic terminals. High glucose-induced ROS promoted early endosomal abnormalities through increased PICALM (phosphatidylinositol binding clathrin assembly protein) expression and decreased VPS26a (vacuolar protein sorting-associated protein 26a) expression, leading to an elevation in amyloid beta (A β) production. In addition, we observed that the over expression of TRIM16 (tripartite motif-containing protein 16) restores high glucose-induced ROS-mediated lysosomal dysfunction and, consequently, inhibits intraneuronal A β accumulation.

REACTIVE OXYGEN SPECIES (ROS) AND NEURODEGENERATIVE DISEASES

We found that Urolithin A, a metabolite produced by gut microbes, inhibits neuronal apoptosis by maintaining mitochondrial calcium and mitochondrial ROS homeostasis through the inhibition of TGM2 (transglutaminase2)-dependent endoplasmic reticulum-mitochondrial contact. We also proposed that sodium butyrate can inhibit high cholesterol-induced ROS and A β accumulation through NRF2 (Nuclear factor erythroid-2-related factor 2)-mediated upregulation of SOD1 (superoxide dismutase 1) expression. In conclusion, we have elucidated the mechanisms of ROS-mediated neuronal damage in diverse stress environments, and these findings are anticipated to contribute to the development of novel treatments for neurodegenerative diseases.

COMBINED LASER-ACTIVATED SVF AND PRP REMODELED SPINAL SCLEROSIS VIA ACTIVATION OF OLIG-2, MBP, AND NEUROTROPHIC FACTORS AND INHIBITION OF BAX AND GFAP

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Background: A single injection of platelet-rich plasma (PRP) or stromal vascular fraction (SVF) in treating neurological ailments suggests promise; however, there is limited evidence of the efficacy of combination therapy. Objective: This trial aimed to determine whether combining SVF and PRP could provide further therapeutic effects in treating multiple sclerosis (MS). Methods: Fifteen Persian cats were separated into three groups (n=5): group I (control negative), and group II (control positive); EB was injected intrathecally into the spinal cord and then treated 14 days later with intrathecal phosphate buffered saline injection, and group III (SVF + PRP), cats were injected intrathecally with EB through the spinal cord, followed by a combination of SVF and PRP 14 days after induction. Therapeutic effects were evaluated using the Basso-Beattie-Bresnahan scale throughout the treatment timeline and at the end. Together with morphological, MRI scan, immunohistochemical, transmission electron microscopy and gene expression investigations. Results: The results demonstrated that combining SVF and PRP successfully reduced lesion intensity on gross inspection and MRI.

COMBINED LASER-ACTIVATED SVF AND PRP REMODELED SPINAL SCLEROSIS VIA ACTIVATION OF OLIG-2, MBP, AND NEUROTROPHIC FACTORS AND INHIBITION OF BAX AND GFAP

In addition to increased immunoreactivity to Olig2 and MBP and decreased immunoreactivity to Bax and GFAP, there was a significant improvement in BBB scores and an increase in neurotrophic factor (BDNF, NGF, and SDF) expression when compared to the positive control group.

Conclusion: Finally, intrathecal SVF + PRP is the most promising and safe therapy for multiple sclerosis, resulting in clinical advantages such as functional recovery, MRI enhancement, and axonal remyelination.

Keywords: low-level laser; multiple sclerosis; platelet-rich plasma (PRP) Persian cat; regenerative medicine; stromal vascular fraction (SVF).

AMELIORATIVE EFFECT OF SELENIUM-LOADED CHITOSAN NANOPARTICLES ON BRAIN, OVARY, AND LIVER OF ADULT FEMALE ALBINO RATS EXPOSED TO SILVER NANOPARTICLES

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Background: As silver nanoparticles (Ag-NPs) are increasingly used in various applications, concerns about their harmful effects are increasing. Selenium plays a vital role in the antioxidant defense system as well as free radical scavenging activity. Objectives: This study aimed to inspect the protective effects of selenium-loaded chitosan nanoparticles (CS-SeNPs) against the adverse impact of Ag-NPs in the rat brain, ovary, and liver tissue sections. Methods: Forty adult female Albino Wistar rats were divided into four groups: control was administered distilled water (0.5 ml/kg), group II received Ag-NPs (100 mg/kg), group III received Ag-NPs (100 mg/kg) and CS-SeNPs (0.5 mg/kg) and group IV received only CS-SeNPs (0.5 mg/kg) daily by oral gavage for 60 days. Rats were subjected to behavioral assessment (Open field test and Dark light activity box) and then euthanized, samples from various brain regions, ovaries, and liver tissues were subjected to biochemical (total antioxidant capacity (TAC) and Nuclear Factor Erythroid 2 Like Protein 2 (Nrf2) malondialdehyde (MDA) and 8-hydroxy-2-deoxy Guanosine (8-OHdG), reduced glutathione (GSH), superoxide dismutase (SOD), catalase, ALT, AST, tumor necrotic factor (TNF α), interleukin 6(IL6)), histopathological, and immunohistochemical (GFAP, PCNA, Caspase) analyses.

AMELIORATIVE EFFECT OF SELENIUM-LOADED CHITOSAN NANOPARTICLES ON BRAIN, OVARY, AND LIVER OF ADULT FEMALE ALBINO RATS EXPOSED TO SILVER NANOPARTICLES

Results: Ag-NPs administration significantly decreased TAC and Nrf2. Whereas it markedly increased MDA and 8-OHdG in brain tissue. Moreover, they significantly reduced GSH and SOD in ovarian tissue. Furthermore, it markedly reduced TAC and catalase, while it significantly elevated the levels of ALT, AST, TNF α , and IL6 in hepatic tissue. Furthermore, Ag-NPs induced severe histopathological changes including neuropil vacuolations, vascular congestion, and neuronal degeneration. Additionally, degenerated oocytes and deformed follicles in ovarian tissue. Moreover, disorganization of hepatic plates, degenerated bile ducts, and hepatocytes in liver tissue. Ag-NPs treatment also resulted in an intense positive GFAP immune reactivity in brain tissue, caspase-3, and PCNA in both ovary and liver tissues. On the contrary, the administration of CS-SeNPs with Ag-NPs revealed partial recovery in the form of noticeable improvement in the degenerative changes. Some pyramidal neurons appeared with normal morphology with vesicular nuclei in addition to an apparent reduction in the neuropil vacuolation, pericellular, and perivascular spaces were observed in brain tissue and in ovarian tissue exhibited partial recovery which appeared approximately with normal ovarian follicles and reduction vascular congestion and in hepatic tissue showed nearly normal hepatocytes restoring their typical polygonal shape with central spherical nuclei with moderate immunohistochemical expression. While the group treated with CS-SeNPs only showed non-significant changes in comparison with the control.

Conclusion: Ag-NPs administration induced evident histological and biochemical alterations in the brain (cerebrum, hippocampus, and cerebellum), ovary, and liver tissue sections of adult female Albino rats. CS-SeNPs displayed an amelioration for the neurotoxicity, ovarian toxicity, and hepatotoxicity induced by Ag-NPs which may be attributed to its direct antioxidant activity or by its ability to replenish glutathione.

Keywords: Ag-NPs; CS-SeNPs; histopathology; immunohistochemistry; oxidative stress.

RECOVERY OF RECOMBINANT AVIAN PARAMYXOVIRUS TYPE-3 STRAIN WISCONSIN BY REVERSE GENETICS AND ITS EVALUATION AS A VACCINE VECTOR FOR CHICKENS

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Background: Avian paramyxovirus type 3 (APMV-3) is more immunogenic than the vaccinal strains of APMV-1. It also has minimal interaction with the anti-Newcastle disease virus maternal antibodies. APMV-3 strain Netherlands (APMV3-Neth.) shows pathogenicity in young chicks, while APMV3 strain Wisconsin (APMV3-Wisc.) does not. It is expected that APMV3-Wisc. Could be used as a safe virus vector for the vaccination of young chicks. Objectives: Construction of a reverse genetics (RG) system for the recovery of APMV3-Wisc. and evaluation of the recovered recombinant virus as a vector vaccine in young chicks. Methods: Four plasmids expressing the virus antigenomic RNA and the polymerase proteins were designed and constructed using the full genomic sequence, site-directed mutagenesis, and molecular cloning. The four plasmids and modified vaccinia virus expressing T7 polymerase were used to recover the recombinant virus in mammalian (HEp-2) cells. The recovered recombinant virus was evaluated as a virus vector for foreign gene (GFP) expression and growth kinetics in avian cell culture. APMV3-Wisc. was compared to APMV1 and APMV3-Neth. vectors expressing GFP in terms of tissue tropism, pathogenicity, and immunogenicity in young chicks. Results: The developed RG system successfully recovered a recombinant APMV3-Wisc. that was used to express GFP. In day-old chicks, the three APMV vectors induced seroconversion. APMV3-Wisc. was safe and confined to the respiratory tract while APMV3-Neth. showed pathogenicity and propagated to different body organs. Conclusion: An RG system was successfully developed for the use of APMV3-Wisc. as a virus vector. The system allows for the study of the molecular basis of APMV3 pathogenicity and the engineering of a chimeric vector that combines the advantages of both APMV3 strains.

Keywords: Avian Paramyxovirus-3, virus vector, vaccination, Reverse Genetics, Newcastle disease virus.

CHARACTERIZATION OF VELOGENIC NEWCASTLE DISEASE VIRUS GENOTYPE VII FROM MALLARD DUCKS SHOWING NERVOUS SIGNS IN EGYPT

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Background: Newcastle disease (ND) is a highly contagious viral disease of wild and domestic birds causing huge economic losses worldwide. In Egypt, domestic waterfowl are considered reservoirs for NDV strains of genotype VII. Objectives: Isolation and characterization of velogenic NDV genotype VII from a backyard flock of mallard ducks showing severe nervous signs with high mortalities. Methods: Tracheas were collected from ducks then tracheal suspensions were inoculated into SPF embryonating chicken eggs. The allantoic fluids were tested by HA assay and then tested by RT-PCR with specific primers for H5, H9, and NDV. Sequencing of the full F and HN genes was performed after amplification of each gene into two segments. Moreover, the pathogenicity of the isolated NDV strain was tested in 21-day-old mallards and Pekin ducks. **Results:** Embryonic death occurred on the second day after inoculation with severe hemorrhages. The allantoic fluids were HA-positive and showed positive results for NDV only by RT-PCR. Phylogenetic analysis of the full F and HN gene sequences indicated that the virus clustered within genotype VII. The amino acid sequence of the fusion protein cleavage site was 112RRQKR116 and phenylalanine at residue 117 indicating a virulent NDV strain. In the pathogenicity study, both duck breeds showed a decreased appetite, depression, and diarrhea. The postmortem examination revealed enteritis, pneumonia, and petechial hemorrhages on the thymus. **Conclusion:** We observed the evolution of NDV strains from genotype VII with increasing pathogenicity in ducks. The results obtained in this study highlight the need for routine vaccination of ducks and geese with NDV vaccines to control the disease and its evolution.

Keywords: Newcastle disease virus; genotype VII; ducks; Egypt.

RECOGNITION OF ADAPTIVE MUTATIONS SITES ON P1 STRUCTURAL PROTEIN OF FMD SAT2 SUDANESE VACCINE STRAIN

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Background: The first step of developing an FMD vaccine is virus adaptation in the BHK cell line to produce the master seed of the vaccine. The SAT2 subtype of the FMD virus has a poor growth characteristic in cell culture, which is considered a nightmare to vaccine producers. Successful virus adaptation in BHK cells is achieved by rapid growth in cell culture, sustained measurable virus titers, and the ability to use new receptors on BHK cell lines like heparin sulphate and $\alpha\text{v}\beta 6$. Objectives: Adaptation of FMD SAT2 virus isolated from a field outbreak in North Kordofan (Western Sudan) in BHK clone 21 cell line to produce vaccine master seed. Methods: The virus was propagated on bovine kidney primary cell culture for 4 successive passages and transferred to the BHK 21 cell line for 28 passages. Virus titration was performed several times to track the increase in virus titer and a one-step growth curve was built up. Molecular characterization of the virus was carried out using one-step RT-PCR and sequencing of the P1 region. Bioinformatics analysis was conducted using bioedit, Clustal W, Hope CMBI, and Chimera X version 0.1 software. Results: The virus revealed an acceleration of growth in cell culture with 90% CPE and a titer of 107 TCID₅₀ after 14 hours. Three novel adaptation sites were identified on the virus capsid P1 polypeptide for the first time. Two positive charges were recognized on the VP1 protein and the third was found on the VP3 protein. Residue deletions were positively selected in VP1 protein including RGD motif and 18 residues downstream the RGD and two upstream RGD. The Leucine residue after the +4 RGD motif was not deleted by the virus and this position showed high conservation between all the FMD serotypes. **Conclusion:** During adaptation, the virus follows three strategies; first Increase the virus virulence and titers by using heparan sulphate receptor after the acquisition of a positive charge in the capsid. Secondly, delete the RGD motif to use Leucine residue which interacted with the $\alpha\text{v}\beta 6$ receptor. Thirdly, improves the capsid thermostability after shifting in VP3 protein which boosts the hydrophobic effect to result in a more stable protein.

Keywords: FMD SAT2, vaccine, virus adaptation

Keywords: Newcastle disease virus; genotype VII; ducks; Egypt.

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Session 6

MODERN TECHNOLOGIES IN VETERINARY
DIAGNOSTIC APPROACHES

Thursday 15 February 2024
11:00 – 12:45

PREDICTIVE MODELS FOR FOOD SAFETY AND QUALITY: FAST AND FUTURE PERSPECTIVE

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Predictive microbiology is a scientific branch of food microbiology intended to quantify microbial responses in foods as a function of both intrinsic and extrinsic factors in food-related environments. With this quantitative knowledge, mathematical models can be constructed to serve as predictive tools. Over the last few decades, an extensive number of predictive models have been developed, and several approaches have been proposed, including, among others, the Baranyi and Robert's growth model family, or the cardinal and gamma concepts for relating environmental factors to the kinetic parameters of microbial populations in the 90's. Other specific developments related to dynamic predictions under changing environmental conditions, optimal experimental design for deriving more cost-effective experimental approaches to construct robust models, and model integrations into probabilistic risk assessment studies have emerged as useful model applications. The latter are key, scientific-based instruments, to assess and test effective control measures and food policies from a public health perspective. The blossoming of predictive microbiology tools in recent years, driven by significant advances in computing and software engineering, has inaugurated a new era in the field, enabling the customization of models for specific applications and contexts. An example of such tools is Com-Base or MicroHibro (www.microhibro.com), which are considered reference tools worldwide, offering different features for developing predictions, risk assessment models, and shelf-life estimations. The industry 4.0 revolution and omics technologies have paved the way for the next generation of models. Big data, along with a deeper and more quantitative understanding of biological processes and metabolic pathways, enable more mechanistic modeling approaches, such as single-cell modeling and systems biology models. These advancements have broadened the scope of predictive capabilities, fostering more comprehensive and integrative predictions that embrace a farm-to-table perspective and the One Health approach. Predictive microbiology and food models have become essential tools in traceability systems by providing early warning capabilities regarding food safety and quality, enabling the implementation of practical concepts like dynamic shelf-life or freshness indices. Models are the central component of several food safety management approaches and are increasingly becoming the cornerstone for bio-digital convergence in the food safety sector and the broader food industry.

MULTIFACTORIAL INVESTIGATION OF STAPHYLOCOCCAL ENTEROTOXINS IN MARINATED CHICKEN SHAWARMA AT STATIC AND DYNAMIC TEMPERATURE PROFILES

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Background: There is an increasing need for wholesome street food. One of the most well-liked marinated meat dishes in the Middle East and Mediterranean regions is Chicken Shawarma, which consists of a marinated cone of meat which is cooked on a vertical rotisserie. Staphylococcus aureus is one of foodborne pathogens that most frequently linked to Shawarma, and it might put customers at risk if proper food hygiene procedures are not followed. **Objectives:** Investigating the growth behavior of *S. aureus* and its ability to produce enterotoxins in Shawarma under static and dynamic temperature ranges. **Methods:** Shawarma samples produced at a laboratory scale were inoculated with strain cocktail of *S. aureus*. Samples were incubated at various static temperatures (10, 20, 30, and 40 °C). Also, two Shawarma cones of meat with various diameters were cooked using dynamic time-temperature profiles simulating realistic dynamic temperature conditions. The observed counts were used to derive kinetic parameters to model *S. aureus* growth. Furthermore, enterotoxin production by *S. aureus* was investigated by using RIDASCREEN® SET Total enzyme immunoassay at different temperature conditions exhibiting pathogen growth. In parallel, the effect of food matrix and marination on the enterotoxin production ability was also analyzed, developing a multifactor analysis. **Results:** The results revealed that the marination has a significant effect on enterotoxin production at 30 °C and 40 °C static temperature conditions, and at large diameter dynamic temperature profiles, and there is a strong, positive correlation between *S. aureus* count and staphylococcal enterotoxin production in the inoculated marinated chicken Shawarma, which was statistically significant (Spearman's rho = 0.8611, p-value <0.001). **Conclusion:** The marination has a significant effect on enterotoxin production and there is a positive correlation between *S. aureus* count and staphylococcal enterotoxin production in the inoculated marinated chicken Shawarma.

Keywords: Chicken meat, Food safety; Growth kinetics; Staphylococcal enterotoxins; Staphylococcus aureus.

HYDROPHOBIC CARBON QUANTUM DOTS FOR PRODUCTION OF ANTIMICROBIAL COATINGS: INSIGHTS ON THEIR APPLICATIONS IN THE VETERINARY FIELD

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Background: Bacterial resistance to antibiotics is a worldwide problem. The main reason is the excessive administration of antibiotics. With the continuous emergence of resistant bacteria, comes the need to develop alternative and sustainable antibacterial materials and surfaces. hCQDs are redox-active materials with high chemical stability and low cost of production. They release singlet oxygen only upon activation by a specific wavelength of visible blue LED light, which allows controllable antibacterial action and minimizes the chances for the emergence of bacterial resistance. Objectives: In this study, we prepared hCQDs-based coatings. The electron paramagnetic resonance method (EPR) and bacterial culture on plate count agar confirmed their antibacterial activity.

Methods: Synthesis of hCQDs and preparation of hCQDs based coatings: hCQDs were synthesized using a bottom-up approach utilizing a carbon source as a precursor. Two types of coatings (used for stones and wood) were mixed with hCQDs in a ratio of 1:1 by volume to form a homogenous mixture.

EPR method: Singlet oxygen generation of coatings with or without CQDs had been investigated. All samples were exposed to blue light (BL). The light source was an LED lamp (wavelength is 470 nm, intensity is 700 $\mu\text{W}/\text{cm}^2$).

Antibacterial testing: Antibacterial activity was tested according to ISO 22196 using *Staphylococcus aureus* and *Escherichia coli*. All specimens were incubated under blue light (with the same wavelength and light intensity as EPR) for 30 min. Results: We found that both hCQDs-based coatings showed stronger EPR signals compared to the pure ones. This result shows the high release of singlet oxygen in the case of hCQDs-based coatings, which reflects their potential antibacterial activity. Singlet oxygen can inhibit the bacteria independent of their surface charges. In antibacterial testing on agar plates, only 30 minutes of BL exposure for hCQDs-based coatings leads to significant killing and elimination of both bacteria used in the assay.

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Inhibition of both Gram-positive and Gram-negative bacteria denotes the broad spectrum of them. Conclusion: hCQDs-based coatings represent a perspective for the future, especially in the field of walls and surface coatings in animal farms, as well as in products for other industries.

Keywords: antimicrobial; carbon quantum dots; coatings; photodynamic effect; singlet oxygen.

ASPERGILLUS FUMIGATUS' GLIA, GLIP, AND GLIZ GENES EDITED USING CRISPR/CAS9 SYSTEM

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Background: Out of all the pathogenic species of Genus *Aspergillus*, *Aspergillus fumigatus* is the key source of human, animal, poultry, and fish infection. It causes aspergillosis with a high mortality risk. In birds, aspergillosis is very common where it causes pulmonary and/or air sac infections. In cats and dogs, it causes mild nasal passage infection. This pathogen is the main causative agent of bovine aspergillosis which results in placentitis and abortions in pregnant bovine. It has been reported that gliotoxins of *A. fumigatus* play a crucial role in its pathogenicity. Gliotoxin production is controlled by the *gli* cluster which contains 13 genes out of which *gliA*, *gliP* and *gliZ* are of prime importance. **Objectives:** This study was conducted to edit these target genes using CRISPR/Cas9 system to check the gliotoxin production after gene editing. **Methods:** crRNAs were designed using EuPaGDT and synthesized from the IDT, USA, and Cas9 nuclease was purchased from ThermoScientific (Germany). Ribonucleoprotein complexes (RNPs) were prepared in-house using crRNAs, tracrRNAs, and Cas9 nuclease. Protoplasts of *A. fumigatus*, produced using standard protocols, were transfected with individual RNPs under PEGylated conditions, and incubated on Sabouraud's dextrose agar at 32°C for 2 days. Non-treated protoplasts were simultaneously run as a control. DNA extraction using the CTAB-modified method was done on the cultured fungal hyphae. Gene editing confirmation was made through T7E1 assay as per manufacturer's instructions and DNA sequencing was done as per standard protocols. Gliotoxin production was checked using sodium dodecyl-sulfate polyacrylamide gel electrophoresis (SDS PAGE), and thin layer chromatography (TLC). **Results:** Our results show the successful application of the CRISPR/Cas9 gene editing system on *A. fumigatus*. Gliotoxin production was significantly less in the *gliA*- and *gliP*-edited fungus as compared to the wild-type. In vivo trials using the edited *A. fumigatus* on poultry birds are underway. **Conclusion:** We conclude that, since gliotoxins are required by *A. fumigatus* for its pathogenicity, the treatment strategies for aspergillosis should focus on targeting the gliotoxins.

Keywords: *Aspergillus fumigatus*; CRISPR/Cas9; *gliA*; *gliP*; *gliZ*; Gliotoxin

NOVEL INSIGHTS INTO AVIAN PATHOGENIC ESCHERICHIA COLI PATHOGENESIS AND HOST RESPONSE USING BIOLUMINESCENT IMAGING

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Background: Avian pathogenic *Escherichia coli* (APEC) bacterium causes avian colibacillosis, a common bacterial disease in the poultry industry with economic importance, unresolved pathogenesis, and potential zoonotic risk. Despite extensive research on disease pathogenicity, little is known about disease progression and host-pathogen interaction.

Objectives: Assess if bioluminescence imaging could track the progression of APEC in chicken embryos in real-time and non-invasively. Evaluate the enhanced light intensity generated by *ilux2*-APEC after being injected into a chicken embryo. Investigate the pathological and microbial sequential progression of coli septicemia in layers, and transmission of *E. coli* into eggs using *ilux2*-APEC. **Methods:** For in ovo inoculation, genetically modified *E. coli* strains *luxAB-CDE*-*E. coli* PA14/17480/5-ovary and *ilux2*-*E. coli* PA14/17480/5-ovary, along with the parent strain, were used. Afterwards, eggs were imaged daily for bioluminescent detection and quantification up to 5 days post-infection (dpi).

NOVEL INSIGHTS INTO AVIAN PATHOGENIC ESCHERICHIA COLI PATHOGENESIS AND HOST RESPONSE USING BIOLUMINESCENT IMAGING

For the in vivo infection model, 48 hens were allocated into three groups, and were intratracheally inoculated with ilux2-E. coli PA14/17480/5-ovary, E. coli PA14/17480/5-ovary, or PBS. Results: In the in Ovo infection model, embryo lethality was 80-100%, and different bioluminescence patterns were observed when tracking lux-tagged APEC. The main pattern showed increasing bioluminescence over time. In Ovo (intact egg) and ex Ovo (after removing eggshell) bioluminescence strongly correlated. Higher bioluminescence values were obtained from ilux2-E. coli PA14/17480/5-ovary infected embryos compared to lux ABCDE-E. coli PA14/17480/5-ovary. In the in vivo infection model, both strains caused typical clinical signs and lesions of colibacillosis similar to field outbreaks. Based on lung histopathology, colisepticemia progression was divided into four diseases stages characterized histologically by heterophils (1-3 dpi), mixed cells (6 dpi), pyogranuloma (9 dpi), and convalescence (16 dpi), respectively. As the disease progressed, bacterial colonization in host organs decreased, as indicated by measures of bacterial bioluminescence, bacteriology, and quantitative immunohistochemistry. Additionally, immunofluorescence, immunohistochemistry, and bacteria re-isolation confirmed this pattern for E. coli colonizing in hens' reproductive tracts and reaching egg contents.

Conclusion: The bioluminescence imaging system with ilux2 operon provides new insights into colisepticemia pathogenesis by characterizing microbial growth dynamics, host-pathogen interaction during infection, and bacteria transmission to table eggs, which have significant implications for poultry health and food safety.

Keywords: bioluminescence; disease stages; Escherichia coli; In Ovo; laying hens; trans-ovarian/-oviduct.

UNRAVELING THE COMPLEX INTERPLAY OF MICROENVIRONMENT, CAGE POSITION, AND DISEASE IN LAYING HEN PRODUCTIVITY

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Background: Environmental conditions profoundly impact the health, welfare, and productivity of laying hens in commercial poultry farming. **Objectives:** This comprehensive study investigates the interplay between microclimate variations, production indices, and histopathological responses to accidental Newcastle disease virus (NDV) infections within a controlled closed-house system. **Methods:** The research was conducted over seven months in a dedicated laying hen facility in Cairo, Egypt. Microclimate measurements included temperature, relative humidity (RH%), air velocity (AV), and the temperature humidity index (THI). These measurements were obtained from specific locations on both the front and back sides of the facility. Productivity indices, including egg production percentage (EPP), egg weight (EW), average daily feed intake (ADFI), and feed conversion ratio (FCR), were assessed monthly. During an NDV outbreak, humoral immune responses, gross pathology, and histopathological changes were evaluated. **Results:** The results demonstrated significant variations in EPP and EW between the front and back sides, with microclimate factors influencing these variations, except for April and May. Notably, AV had a significant ($p = 0.006$) positive effect (Beta = 0.346) on EW on the front side. On the back side, AV had a significant ($p = 0.001$) positive effect (Beta = 0.474) on EW, while it negatively influenced ($p = 0.027$) EPP (Beta = -0.281). However, temperature, RH%, and THI had no impact and could not serve as predictors for EPP and EW on either farm side. Importantly, the humoral immune response to NDV was consistent across microclimates, highlighting the resilience of hens.

UNRAVELING THE COMPLEX INTERPLAY OF MICROENVIRONMENT, CAGE POSITION, AND DISEASE IN LAYING HEN PRODUCTIVITY

Histopathological examination revealed characteristic NDV-associated lesions, with no significant differences between microclimates. Conclusion: This research underscores the significance of optimizing microclimate conditions to enhance laying performance. This study provides practical insights for poultry industry stakeholders, emphasizing the need for tailored environmental management strategies based on seasonal variations and reinforcing the importance of biosecurity measures under field challenges.

Keywords: climate change; egg layer; Newcastle outbreak; sustainability.

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Session 7

ONLINE KEYNOTE LECTURES

Thursday 15 February 2024

14:30 – 16:00

BROKEN GUT, RUINED LIVESTOCK HEALTH AND PERFORMANCE: HOW TO STOP THIS VICIOUS CIRCLE?

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Livestock are producing animals kept producing milk, meat or eggs for human consumption in a cost-efficient way. They convert feed with a limited nutritive value to a high nutritive food for human consumption. As productive animals, the livestock species during their intensive production cycle have increased demands for energy and nutrients to maintain their performance. In this context, the diet and the gut play important roles to provide the host with the required nutrients, and so supporting the performance and maintaining the health. On the other hand, malnutrition and errors in the feeding management lead to impaired gut health, which in turn jeopardizes both the performance and health status of livestock, recently known as a vicious circle of poor health and performance. Indeed, the gut with the billions of microbes, commonly known as microbiome, interacts closely with the host, providing the host with incredible metabolic capabilities and modulating the health of the gut and systemic health. This article will take as example dairy cows with the health of the rumen and its role to modulate performance, systemic health, and enhancing cost efficiency of cattle production. The inability of the rumen to absorb large amounts of fermentation acids disrupts the homeostatic rumen acid-base regulation, which is a critical for maintaining healthy and optimal conditions for the microbiome to thrive (e.g. normobiosis). As a consequence, the rumen losses some of its main metabolic functions and a large amount of ingested substrates bypasses the rumen undigested and challenges the normobiosis in the lower parts of the digestive tract. Accumulating evidence suggests that dysbiosis leads to a disruption of homeostasis and development of inflammation in cattle. Most importantly, this disorder impairs rumen functioning and exacerbates health status of animals, triggering cascades of events that lead to many metabolic and infectious diseases such as laminitis, ketosis, milk fat depression syndrome, displaced abomasum, hindgut acidosis, shedding of pathogens, systemic inflammation and poor reproduction. This article and the talk will deal with challenges to maintain proper rumen and gut health in cattle, highlighting current data of rumen microbiome and metabolome research. This article will also show underlying mechanisms of gut health disorders and provide dietary recommendations to maintain and enhance gut health in dairy cows; thus helping to stop the vicious circle of poor animal health.

WHEN FOOD SAFETY AND SUSTAINABILITY INTERSECT: ACADEMIC AND INDUSTRIAL OPPORTUNITIES

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There is a common belief among food processors that having safe products is not always aligned with industry's sustainable practices. The notion that safety and sustainability are mutually exclusive targets emanates from the high-cost burden associated with ensuring food safety, while sustainability, in essence, aims at reducing the costs of food production and processing. It is prudent that food processors, particularly those in developing countries, rethink their modus operandi and plan their future strategies on an industry that accommodates safety and sustainability without contradiction. There are many examples showing how safety and sustainability can coexist even in the most complex food supply chains. At the very basic level, it is known that applying reliable safety measures (e.g., pasteurization or sterilization) not only decreases the risk of disease transmission by food, but also extends products' shelf-life. Additionally, when the safety of a food in the market is found compromised, food regulatory agencies ideally recall the product and tag it for disposal, destruction, or incineration, an action that considerably burdens the environment and adds to production and processing costs. Incremental improvements in food sustainability have been in the works, with the hope that food safety is not adversely affected. For example, labeling processed food with an "expiration date" is no longer the practice; less blunt dates are now used such as sell-by, best used by, enjoy by, etc. However, there is a need to determine the points in quality determination that trigger food safety hazards. In conclusion, food sustainability policies are not only about reducing the costs and protecting the environment, they also must include provisions for improving human health and country's economic viability.

ADVANCEMENTS IN PRECISE DIAGNOSIS: INTEGRATING DIGITAL PATHOLOGY AND ARTIFICIAL INTELLIGENCE

Ayman El-baz

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The convergence of Digital Pathology (DP) and Artificial Intelligence (AI) has revolutionized the landscape of medical diagnostics, offering unprecedented opportunities for precise and efficient disease identification. Digital Pathology involves the digitization of traditional glass slides, enabling remote access, collaborative consultations, and archival of vast datasets. Simultaneously, AI algorithms, with their capacity for rapid pattern recognition and analysis, have emerged as invaluable tools in the interpretation of these digital pathology images. This talk explores the synergistic role of Digital Pathology and AI in achieving precise diagnoses. The integration of AI into the diagnostic workflow enhances the accuracy and speed of pathology assessments, providing pathologists with advanced decision support. Machine learning algorithms trained on extensive datasets can identify subtle patterns, predict disease outcomes, and contribute to personalized treatment strategies. Moreover, the collaborative nature of Digital Pathology facilitates the development and validation of AI models across diverse datasets and geographic locations. The adoption of Digital Pathology and AI in diagnostic practices has led to significant improvements in efficiency, objectivity, and reproducibility. It enables pathologists to focus on complex cases while reducing the likelihood of diagnostic errors. Furthermore, the real-time analysis capabilities of AI contribute to timely interventions, ultimately enhancing patient outcomes.

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Session 8

DAY ONE COMPETENCES IN VETERINARY MEDICINE

Thursday 15 February 2024
16:00 – 17:45

INFLUENCE OF COVID-19 ON THE POULTRY PRODUCTION

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The COVID-19 pandemic is unlike previous pandemics such as SARA-CoV and Ebola. COVID-19 severely impacted the food supply chain indirectly, through disruptions of the downstream stages such as transport and logistics. Also, it affected all dimensions of food security, including availability, stability, and sustainability, depending on the industry, the locality, and the financial status of the affected regions. Generally, animal production sectors in several countries worldwide were significantly influenced by COVID-19; and damaged the poultry and further animals' sectors worldwide. This even negatively affected the animal industry via disruptions in supply chains, scarcity of human resources, the malfunctioning and close of livestock markets, high prices, which leads to changes the consumer shopping behaviour. Although there are no evidence was found indicating that SARS-CoV-2 can be transmitted to humans via poultry products; however, the poultry industry is negatively impacted globally. It is estimated that the losses might be greater than those, due to the avian influenza pandemic of 2006 as 400 million birds, were globally culled. The negative impacts of COVID-19 on the poultry industry are attributed to the indirect effects, due to the restriction of movement, which leads reduction and /or stop supplies of feed, birds, medicine, vaccines, as well as the poultry products. Additionally, the strict restrictions during this pandemic disrupted the marketing of poultry products. Due to the closure of markets and the farmers, were unable to sell poultry meat, and eggs at local markets or restaurants, which resulted in substantial financial losses. In developing countries, the negative impacts of COVID-19 on poultry were found to be much higher than those in developed countries because poultry production serves to fight poverty and food scarcity. Poultry services were reduced, such as equipment, day-old chicks for stock replacements, feed, vaccines, drugs, diagnostics, and feed additives (vitamins and minerals). Exporters in several countries also faced a considerable drop in demand for livestock-based foods in major importing markets. Market closures and transportation restrictions hampered access to markets and customers, affecting both animals and animal products, such as eggs and meat. The shortage of laborers severely impacted the poultry industry in developing countries, since poultry farmers rely on human resources rather than machines.

SALMONELLA MONITORING IN EUROPEAN POULTRY PRODUCTION: PREVALENCE, EPIDEMIOLOGY & DETECTION

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In the European Union, on a yearly basis, prevalence data on the occurrence of target *Salmonella* species, namely *S. Enteritidis*, *S. Typhimurium*, *S. Infantis*, *S. Hadar*, *S. Virchow*, has to be provided from each member state resulting in an EFSA report, The European Union One Health Zoonoses Report. This report does not only provide data on prevalence of *Salmonella* in regard to the different production levels (e.g. breeder, laying hens, broilers) but gives also information on the occurrence of *Salmonella* in food and animal sources. For this, strict and targeted measures concerning zoonotic *Salmonella* monitoring and control are implemented and high quality of surveillance is ensured by obligatory investigation of samples from the primary production level of animals according to EN/ISO standard 6569-1:2017. The use of certain media is compulsory, and the workflow includes non-selective and selective enrichment steps on liquid and semi-solid media as well as cultivation on selective solid media are necessary. Two phenotypic characteristics of *Salmonella* exhibited on these media are crucial for correct diagnosis: motility and production of hydrogen sulfide (H₂S). In recent years, *S. Infantis* became the most common serovar in broiler chickens in the European Union. This goes along with being among the top four common serovars in humans. Of certain concern are isolates harboring a large conjugative megaplasmid named pESI (plasmid of Emerging *S. Infantis*) which confers antimicrobial resistance and increases the fitness of its bacterial host. Our recent investigations revealed that atypical phenotypic variants of this serovar occur which pass unnoticed official screening methods, resulting in incorrect identification and being underrepresented in epidemiological surveillance programs.

AN INTERNATIONAL NETWORK OF VETERINARY EDUCATION FOR SUSTAINABLE ANTIMICROBIAL USE AND TACKLING ANTIMICROBIAL RESISTANCE (NETVET4SAMU)

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Background: Antimicrobial resistance (AMR) is a global challenge that leads to pathogens becoming insensitive to existing drugs (diseases that are easily treatable now will become life-threatening in short to medium term). Spreading of resistance is a complex problem that is driven by many interconnected factors, including biology, but also societal considerations. Therefore, interdisciplinary, multi-sectoral, and innovative approaches to understand the drivers of AMR, feasibility, effectiveness, and economic efficiency of potential interventions are required. The overall aim of this network is to facilitate knowledge sharing among veterinary education providers and students and to increase awareness around the importance of veterinary education to mitigate AMR. Our specific objectives are: 1) Assessing knowledge, attitudes and practices (KAP) of final year veterinary students toward antimicrobial use (AMU) and AMR. 2) Reviewing curricula and assessing knowledge gaps in veterinary education regarding AMU and AMR. 3) Co-development of educational and training materials for sustainable AMU for undergraduate, postgraduate students and continuing professional development (CPD) in leading universities and LMICs.

Methods: A systematic literature review (SLR) to assess the impact of veterinary education, training, and antimicrobial stewardship (AMS) on AMU and AMR. The specific objectives are: 1) to identify the current educational, training, and AMS programs either for undergraduate students or post graduate veterinarians to improve AMU and reduce the risk of AMR, 2) to identify studies assessed the impact of these programs.

AN INTERNATIONAL NETWORK OF VETERINARY EDUCATION FOR SUSTAINABLE ANTIMICROBIAL USE AND TACKLING ANTIMICROBIAL RESISTANCE (NETVET4SAMU)

KAP survey for final year veterinary students will be conducted online for which a purposive sampling technique will be used to sample at least three veterinary schools (50 students each) from each country. Academic staff from participating institutes, teaching internal medicine, infectious diseases, pharmacology, and Microbiology, will be invited to participate in an online survey to collect data about the contents of the current curricula related to AMU and AMR.

Results: In progress

Conclusion: Our international network for veterinary education will provide a step-change for embedding sustainable AMR solutions into the next generation of involved practitioners, kick-starting a virtuous cycle of awareness and action globally. This network will facilitate connectivity between veterinary education providers and researchers at local, national and international levels.

Keywords: antimicrobial; one health; resistance; Vet-Education.

GUIDELINES AND REGULATIONS FOR THE ESTABLISHMENT AND FUNCTIONING OF INSTITUTIONAL ANIMAL CARE AND USE COMMITTEES IN EGYPT

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Animals are used for scientific purposes across Egypt to benefit humans, animals, or the environment. Nonetheless, ethical and regulatory oversight remains limited in different parts of the country. To strengthen this governance framework, Cairo University Institutional Animal Care and Use Committee (CU-IACU) created Standards Operating Procedures (SOPs) to facilitate the establishment and appropriate functioning of Institutional Animal Ethics Committees across Egypt. The SOPs focused on essential key elements, including responsibilities of institutions and of the Institutional Official; composition of the Committee; its responsibilities, functioning and authority; ethical application and review processes; oversight and monitoring of animal care and use and of training and competence; quality assurance; and the roles of other responsible parties.

HYALOMMA DROMEDARII LEUCINE AMINOPEPTIDASE: A POTENTIAL ROLE IN TICK CONTROL

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Background: Ticks are important vectors for disease transmission to animals and human and cause considerable economic losses. To control ticks, vaccination of animals using different antigens was studied. Leucine aminopeptidase enzymes (LAP), as regulatory proteins, play an important role during tick infestation by liberating vital amino acids which are necessary for growth of the parasite with potential degrading activity during feeding processes. Objectives: In the current study, we show the sequence identification, cloning, expression and purification of LAP from the hard tick *H. dromedarii*. Furthermore, we describe its biochemical characterization in terms of activity, effect of inhibitors and heavy metals. Finally, the recombinant LAP (rLAP) was used as a vaccine antigen against *H. dromedarii* infestation in rabbits. Methods: The clones from *H. dromedarii* cDNA library were sequenced, annotated and grouped according to the functional groups and enzymatic activities. The sequences containing LAP gene were used to prepare specific probes to identify the full length of the gene from the library. LAP was expressed in *E. coli*, purified and its catalytic properties were determined. The potential role of LAP to confer a protection against tick infestation was analyzed by immunizing rabbits with a recombinant LAP vaccine. Later, animals were challenged with adult unfed ticks. Results: An open reading frame of 1560 bp encoding for a protein of 519 amino acids was cloned. The LAP full-length gene was expressed in *E. coli* BL21 (DE3), then purified.

HYALOMMA DROMEDARII LEUCINE AMINOPEPTIDASE: A POTENTIAL ROLE IN TICK CONTROL

The recombinant enzyme (H.d rLAP-6×His) had a predicted molecular mass of ~55kDa and showed maximum activity at 37°C and pH 8-8.5 using L-leucine-p-nitroanilide as a substrate. The LAP activity was sensitive to β -mercaptoethanol, DL-dithiothreitol, 1,10-phenanthroline, bestatin, and EDTA showing varied degrees of inhibition (50-91%), and completely abolished by 0.05% SDS. In parallel, the enzymatic activity was enhanced by Ni^{2+} , Mn^{2+} and Mg^{2+} , partially inhibited by Na^{+} , Cu^{2+} , Ca^{2+} and completely inhibited by Zn^{2+} . However, intramuscular injection of rabbits with functionally active H.d rLAP-6×His, showed insignificant reduction in the number of *H. dromedarii* attached to the rabbits in the rLAP-immunized animals. Moreover, the feeding period of ticks on the rLAP-immunized rabbits was prolonged to 14.21 ± 0.83 days against 8.59 ± 0.27 days for the control one. The weight of replete females ($0.31 \pm 0.05\text{g}$) resulted from the immunized group exhibited a highly significant decrease ($P \leq 0.001$) when compared with the control group ($0.85 \pm 0.04\text{g}$). Additionally, the indices egg mass, egg numbers and reproductive index were significantly reduced in the immunized group.

Conclusion: LAP has drastic effects on the feeding and reproductive performance of the camel tick *H. dromedarii*.

Keywords: enzyme kinetics; gene expression; *Hyalomma dromedarii*; Leucine aminopeptidase; ticks; vaccines

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SPECIAL TOPICS I

Wednesday 14 February 2024
17:30 – 18:30

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES (IUBS): UNIFYING BIOLOGY THROUGH DIVERSITY

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The vision of International Union of Biological Sciences (IUBS) is unifying biology through diversity. The International Union of Biological Sciences, established in 1919, is a non-governmental and non-profit organization comprising of National Academies and international scientific Associations and Societies. IUBS provides a global platform for cooperation and interaction among scientists from all disciplines and nationalities to promote research, training, and education in biological sciences, while advocating access and benefit-sharing of knowledge and resources. IUBS, a member union of the International Science Council (ISC), is the only international body that represents the entire spectrum of biological sciences. IUBS currently unites more than 110 national, scientific, and institutional members through three types of membership: Ordinary (National), Scientific, and Associate. While IUBS promotes excellence in all topics of Biological Sciences, it aims to understand and find solutions to several scientific questions and to serious and tough challenges, such as the effects of climate change on the Earth, by facilitating collaboration across all disciplines and promoting inputs from science in all policy discussions. In this presentation, I will cover various aspects of IUBS, including its mission, history, structure, and key activities.



ZOETIS AND ONE HEALTH APPROACH

Beshoy Adel

Zoetis, the leading global animal health company, advocates for a One Health approach, linking human health, animal health and ecosystems (60 percent of human infectious diseases originate with animals). Zoetis believes that the tools and technology which protect companion animal health and support production of healthy livestock can positively impact public health with safe and affordable food. Also Zoetis work hardly to create solutions for newly emerging infectious diseases in animals to protect human health. Zoetis is the partner of choice for organizations with similar One Health goals. Zoetis' significant expertise in livestock and companion animal health translates into powerful partnerships with organizations that is working in animal health, pharmaceuticals, biotechnology, agribusiness, and academia. These collaborative partnerships with Zoetis combine complementary talents, expertise, and passion with the expertise to advance science and deliver innovative products for One Health.



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SPECIAL TOPICS 2

Wednesday 15 February 2024

12:45 – 13:45

INTERNATIONAL JOURNAL OF VETERINARY SCIENCE AND MEDICINE: HISTORY AND FUTURE PERSPECTIVES

Hala Zaher

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International Journal of Veterinary Science and Medicine (IJVSM) is an official journal of the Faculty of Veterinary Medicine, Cairo University, published by Taylor and Francis. IJVSM is a peer-reviewed, open-access journal that publishes original research on all aspects of animal science and veterinary medicine. The journal covers topics such as infectious diseases, epidemiology, animal welfare, nutrition, surgery, obstetrics, zoonoses, food hygiene, wildlife diseases, and biotechnology. The journal aims to advance the theoretical and practical understanding of animal health and management and contribute to the development of a sustainable, clean-energy future. All articles published in IJVSM are indexed in Scopus, Web of Science, and PubMed Central (PMC). It holds the eighth position among 186 international veterinary journals, placing it in the 95th percentile (8/186, Q1) with a CiteScore of 5.7 and SNIP of 1.089 in 2022, according to Scopus rankings. Notably, the journal achieved its first impact factor of 2.2 (2022), as reported by the JCR released in 2023. The published articles in the most recent 3 years were from the USA, Mexico, France, Japan, Indonesia, Australia, Thailand, Bangladesh, South Africa, and Egypt. The journal uses social media platforms such as Facebook, LinkedIn, and Twitter to interact with its audience and improve the spread and discussion of its published content. As IJVSM continues to grow and make noteworthy advancements within the scientific community, it remains unwavering in its dedication to its objectives, it remains resolute in its dedication to fulfilling its objectives.

MICROBIAL LYSOZYME AS ANTIBIOTICS ADJUVANT (MN TRADE)

Ahmed Orabi

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Lysozymes, efficient alternative supplements to antibiotics, have several benefits in poultry production. In the present study, 120, one – day – old, Ross 308 broiler chickens of mixed sex, were allocated into 2 equal groups, lysozyme treated group (LTG) and lysozyme free group (LFG), to evaluate the efficacy of lysozyme (LysonirÒ) usage via both drinking water (thrice) and spray (once). LTG had better ($p = 0.042$) FCR, and higher European production efficiency factor compared to LFG ($p = 0.042$). The intestinal integrity score of LTG was decreased ($p = 0.242$) compared to that of LFG; 0.2 vs 0.7. Higher ($p \leq 0.001$) intestinal Lactobacillus counts were detected in chickens of LTG. Decreased ($p \leq 0.001$) IL-1b and CXCL8 values were reported in LTG. The cellular immune modulation showed higher ($p \leq 0.001$) opsonic activity (MΦ and phagocytic index) in LTG vs. LFG at 25 and 35 days. Also, higher ($p \leq 0.001$) local, IgA, and humoral, HI titers, for both Newcastle, and avian influenza H5 viruses were found In LTG compared to LFG. In conclusion, microbial lysozyme could improve feed efficiency, intestinal integrity, Lactobacillus counts, anti-inflammatory, and immune responses in broiler chickens.

Keywords: lysozyme; postbiotic; anti-Inflammatory; immunomodulation; broiler chickens



MN Trade

VACCINE TECHNOLOGY LOCALIZATION IN MENA FOR VACCINE SECURITY AND GLOBALIZATION

MEVAC Staff

MEVAC For Vaccines (Science, Innovation & Protection)

MEVAC is (the first and largest private factory for manufacturing vaccines in Egypt, the Middle East and Africa) with International Accreditations (GMP), ISO 9001, ISO 18001, ISO 14001, ISO 17025 MEVAC officially launched in 2011 with an “Egyptian & American partnership” utilizing the most recent global technologies in the vaccines production with an international quality standard with more than 420 Employees working inside MEVAC and more than 75 innovative products reach more than 36 countries around the world. **Keywords:** lysozyme; postbiotic; anti-Inflammatory; immuno-modulation; broiler chickens.

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POSTERS

P1: INVESTIGATION OF ANTIBIOTIC RESISTANCE PATTERN AND VIRULENCE DETERMINANTS IN AVIAN PATHOGENIC ESCHERICHIA COLI ISOLATED FROM BROILER CHICKENS IN EGYPT

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Background: Besides its zoonotic importance, avian pathogenic *Escherichia coli* (APEC) bacterium causes substantial financial losses in the Poultry industry globally. The progress of antimicrobial resistance in APEC is mainly associated with excessive antimicrobial use and improper sanitation. Since its beginning in the 1970s, the VITEK system has developed into The VITEK 2 system, which has used an automated system to perform all the steps required for microbial Identification and antibiotic susceptibility rapidly and accurately.

Objectives: The present study aimed to update the available Circulating data about APEC isolates
Methods: In this study, 370 clinical cases of broiler chicken (7-21 days old) and broiler breeders (25-30 weeks old) in different breeds were examined for gross lesions of colibacillosis by PM examination. Samples were collected from five Egyptian governorates (Sharkia, Kafr-el-sheikh, Fayoum, Giza, and Qalubia). All investigated farms suffered clinical signs of colibacillosis, including high mortalities, respiratory signs, reduced appetite, and declined growth rate. The samples were collected from different organs (liver, lung, heart, heart blood, and spleen) aseptically. The collected organs were minced and inoculated into the nutrient broth (Oxoid®) incubated aerobically at 37°C for 18-24 hours, before being sub-cultured on MacConkey agar (Oxoid®) and Eosin methylene blue agar (EMB, Oxoid®) aerobically at 37°C for 18-24 hours.

P1: INVESTIGATION OF ANTIBIOTIC RESISTANCE PATTERN AND VIRULENCE DETERMINANTS IN AVIAN PATHOGENIC ESCHERICHIA COLI ISOLATED FROM BROILER CHICKENS IN EGYPT

All the recovered isolates were identified morphologically and bio-chemically. Each isolate was identified by the Gram-negative test kit VITEK 2 system (bioMérieux, France) according to the manufacturer's instructions. The identified *E. coli* isolates were subjected to serotyping as described by Edward (1972). Polyvalent and monovalent diagnostic *E. coli* antisera were used for the sero-grouping of *E. coli* isolates according to somatic (O) and capsular (K) antigens. *Escherichia coli* isolates were subjected to antimicrobial susceptibility testing using AST-GN73 TEST KIT (bioMérieux) using VITEK 2 system version 9.02 software. Molecular identification was made for the analysis of 16srRNA, *papC*, *fimC*, and *iutA* genes of *E. coli* isolates by simple PCR. Results: The prevalence of APEC isolated from the different internal Organs (liver, lung, heart, heart blood, and spleen) was 67.5%. The most prevalent serotypes were O125, O114, O44, O127, O142, and O78. Virulence-associated genes (*iutA*, *fimC*, and *papC*) were detected at rates of 84.4%, 74%, and 54.8%, respectively. The highest resistance was found against ampicillin (100%), trimethoprim sulfamethoxazole (80%), and ampicillin-sulbactam (78.5%).

Conclusion: Almost all isolated *E. coli* serotypes have been determined to be harmful to all broiler breeds; however, no single illness condition or age group could be associated with a specific serotype. The present study revealed a significant prevalence of multi-drug-resistant *E. coli* strains accompanied by a high frequency of virulence genes. Implementing an intervention program to reduce the risk of colibacillosis requires regular screening and monitoring of the virulence genes linked to the antibiotic-resistant APEC strains.

Keywords: *Escherichia coli*; Colibacillosis; VITEK; Virulence genes.

P2: IMPACT OF HOST AND RISK EXPOSURES ON THE PREVALENCE OF RESISTANCE IN ENTEROBACTERIACEAE: THE CASE OF HUMANS AND BROILERS IN THE WEST REGION OF CAMEROON

Jude F. Leinyuy¹, Karimo. O^{1*}, Innocent M. Ali^{1,2}, Christiane. T¹, Georges F. Kuh¹, Djomgoue G. Ngangoum¹, Gustave. S¹, and Christopher B. Tume^{11,3}

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Background: The "One Health" concept holds that human health is closely linked to that of the environment, and the fight against health problems such as antibiotic resistance must be central in the ecosystem.

Objective: To compare the impact of host and selected risks on the prevalence of resistance and resistance gene carriage in Enterobacteriaceae isolates from broilers and find the genetic relatedness of the isolates as a zoonotic link. **Methods:** Enterobacteriaceae isolates from two previous studies isolated from broiler cloacal swabs and human stool samples were selected. Comparison was done for risk exposures (unsafe water, use of antibiotics, contact with faeces; poor sanitation, poor food hygiene and age), antibiotic resistance against quinolones and aminoglycosides and extended spectrum beta-lactamase production, and the carriage of resistance genes against these three antibiotic families were evaluated using logistic regression and odd ratios. Other members of the Enterobacteriaceae family were screened for carriage of resistance genes while the genetic relatedness of isolates of *E. coli* – a clinically important and representative member – from broilers and humans was done via ERIC-PCR.

P2: IMPACT OF HOST AND RISK EXPOSURES ON THE PREVALENCE OF RESISTANCE IN ENTEROBACTERIACEAE: THE CASE OF HUMANS AND BROILERS IN THE WEST REGION OF CAMEROON

Results: There was significantly higher resistance rate in quinolones (43.67 against 35.67%, $p = 0.02275$) and aminoglycosides in poultry isolates than in clinical isolates. On the contrary, ESBL production (29.67 against 21.00%, $p = 0.00734$) and multi-drug resistance were higher in clinical isolates than poultry isolates. More broiler isolates showed resistance to at least one family of antibiotic (52.00 against 32.33%, $p = 0.00001$). Previous usage of antibiotics correlated with resistance to quinolones, aminoglycosides. Hierarchical cluster analysis of ERIC patterns for *E. coli* isolates by means of dendrogram gave three main clusters each containing isolates from both humans and poultry indicating genetic relatedness. Conclusion: Host type was determinant in the resistance outcomes with higher prevalence of resistance to quinolones and aminoglycosides, plasmid-borne resistance gene carriage higher in poultry isolates. Chicken showed a general higher resistance and resistance gene carriage. Genotyping of *E. coli* shows genetic relatedness between human and poultry isolates, a proof of zoonotic circulation of the bacteria.

Keywords: Enterobacteriaceae, host, antibiotic resistance, genetic relatedness and One Health

P3: INVESTIGATION OF SILVER NANOPARTICLES ROLE AS A SUSTAINABLE SOLUTION TO REDUCE DEVELOPMENT OF MULTIDRUG-RESISTANT SALMONELLOSIS IN SMALL RUMINANTS

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Background: The emergence of MDR Salmonella constitutes a great challenge for salmonellosis control in both animals and humans, and advocates for the need to investigate antimicrobial alternatives as a method of disease control. Objectives: The current study objective is to investigate the treatment approach of silver nanoparticles for multidrug-resistant Salmonella spp. recovered from diarrheic small ruminants in Egypt.

Methods: Synthesis of AgNPs by chemical reduction method followed by characterization of morphology, size, particle size distribution and zeta potential analysis, and functional groups in molecules through using Transmission Electron Microscopy (TEM), a nano-zetasizer, and Fourier transform infrared spectroscopy (FTIR) analysis. The antimicrobial efficacy of synthesized AgNPs was evaluated after complete characterization procedures. The in vitro antibacterial effects were investigated by measuring minimum bactericidal concentration (MBC) and minimum inhibitory concentration (MIC) for each Salmonella spp. isolate using the microplate dilution method and tetrazolium salt reduction test. While in vivo therapeutic potential against S. Enteritidis was investigated in mice by counting the viable salmonellae recovered from feces in combination with hematological, biochemical and histopathological analyses to authorize that use of AgNPs neither has a toxic nor a pathologic effect and to evaluate its tissue regenerative ability following treatment process.

P3: INVESTIGATION OF SILVER NANOPARTICLES ROLE AS A SUSTAINABLE SOLUTION TO REDUCE DEVELOPMENT OF MULTIDRUG-RESISTANT SALMONELLOSIS IN SMALL RUMINANTS

Results: The results revealed that all *Salmonella* spp. isolates were categorized as MDR according to MAR index estimation. Typical characteristics of the synthesized AgNPs were validated by TEM, DLS, Zeta potential, and FTIR findings. Silver nanoparticles exhibited their potential antibacterial efficacy against all recovered isolates in both in vitro and in vivo. The exhibited MBC was of 0.078–1.250 µg/ml (average 0.508 ± 0.315 µg/ml) and MIC was of ≤ 0.02 –0.313 µg/ml (mean average 0.085 ± 0.126 µg/ml). The therapeutic potential in experimentally *S. Enteritidis* infected mice was detected by a reduction in the viable number of recovered salmonellae from mice feces, with complete shedding stoppage between the 4th and 6th days of treatment. Hematological, serum biochemistry, and histopathological findings ascertained the capability of AgNPs to suppress enteritis and hepatitis caused by *S. Enteritidis* infection. Conclusion: In conclusion, the study verified the therapeutic potential of AgNPs as a sustainable antibacterial alternative to combat MDR *Salmonella* species in vitro and in vivo without opposing effects.

Keywords: Mice, Minimum bactericidal concentration, Minimum inhibitory concentration, Multidrug resistance, *Salmonella*, Silver nanoparticles.

P4: PREVALENCE, ISOLATION, SERODIAGNOSIS, AND TREATMENT OF CONTAGIOUS PUSTULAR DERMATITIS IN SHEEP AND GOATS IN EGYPT, 2023

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Background: Contagious Pustular Dermatitis (CPD) is one of zoonotic viral diseases of ruminants specially sheep and goats. The virus has a worldwide distribution causing economic losses and human health hazards. CPD has several synonyms including Contagious Ecthyma (CE), Sore Mouth, Scabby Mouth, and ORF. Objectives: Studying the prevalence, serodiagnosis, and treatment of Contagious Pustular Dermatitis as well as isolation of the virus from naturally occurring cases for use as a seed in vaccine production.

Methods: The prevalence and clinical signs of CPD in the examined sheep and goat flocks were recorded during 2023 in the Giza governorate. The scabs of oral commissure lesions were collected from the CPD-infected sheep and goats. Serum samples were collected from the infected sheep and goats after treatment and recovery. The prepared scab samples were inoculated on the Chorio-Allantoic Membrane (CAM) of Embryonated Chicken Eggs (ECE) for five passages. The pock lesions developed on CAM were prepared and inoculated on Vero cell culture for the isolation of the CPD virus. A Serum Neutralization Test (SNT) was carried out on the collected serum samples using a control virus. The treatment protocol for CPD-infected sheep and goats depended on injection of oxytetracycline 20% once every three days (at a dose rate of 1 ml per 10 kilograms body weight 'Kg. B.W'), diclofenac sodium 5% once daily for one week (at a dose rate of 1 ml per 50 kg. B.W), AD3E injection once daily for one week (at a dose rate of 1 ml per 20 kg. B.W) and mouth spray (Oxy-G) twice daily for one week.

Results: The prevalence of CPD in the examined sheep and goats was 4.34% (19/437).

P4: PREVALENCE, ISOLATION, SERODIAGNOSIS, AND TREATMENT OF CONTAGIOUS PUSTULAR DERMATITIS IN SHEEP AND GOATS IN EGYPT, 2023

The clinical signs were recorded as salivation, proliferative skin eruptions at oral commissures, lips, dental gums, and on teats of lactating ewes and do. The pock lesions of the CPD virus were observed on CAM on the fifth day post-inoculation, while the cytopathic effects were observed on Vero cell culture after four blind passages from the fifth to seventh-day post-inoculation. SNT confirmed that the collected serum samples were positive for CPD. All infected sheep and goats were safely recovered post-treatment. Conclusion: CPD is prevalent in sheep and goats and can be diagnosed by isolation and serodiagnosis. The treatment protocol was successful to help CPD infected sheep and goats recover safely.

Keywords: Contagious Pustular Dermatitis (CPD); goat; isolation; serodiagnosis; sheep; treatment.

P5: MANAGEMENT OF ISCHEMIA-REPERFUSION IN RAT MODELS OF DIFFERENT AGES AND DOCUMENTATION OF AGE-RELATED CHANGES IN RENAL AGING AND OXIDATIVE BIOMARKERS

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Background: AKI is a clinical illness characterized by rapid malfunction of the kidney. AKI could be a sequel of heart failure, sepsis, bleeding, nephrotoxic medications, and COVID-19. AKI is primarily caused by renal IRI. Age, oxidative stress, and inflammation can cause a reduction in MnSOD expression. P27, a cyclin-dependent kinase inhibitor. H2AX expression may be enhanced in the setting of AKI and IRI due to the DNA damage response. Aging and various clinical diseases, including AKI and IRI, may alter the expression levels of IDO, MnSOD, P27, and H2AX. IDO expression may be upregulated as part of the immune response and oxidative stress associated with tissue injury. Objective: The study aimed to examine changes in the biomarkers IDO, MnSOD, P27, and H2AX and their relationship to IRI and AKI.

Methods: The study involved the use of male Lewis rats aged 3, 6, and 18 months old and control). Each group consisted of 10 rats. The rats were subjected to bilateral renal pedicle clamping for 40 minutes at 37°C. After a 40-minute period of ischemia followed by 96 hours of reperfusion rats were sacrificed and kidneys were removed and stored for protein analyses. Western blotting was used to analyze the abovementioned proteins.

P5: MANAGEMENT OF ISCHEMIA-REPERFUSION IN RAT MODELS OF DIFFERENT AGES AND DOCUMENTATION OF AGE-RELATED CHANGES IN RENAL AGING AND OXIDATIVE BIOMARKERS

Conclusion: Rat kidneys' expression levels of IDO, MnSOD, and gamma H2AX change with age. Variations in the expression of IDO, MnSOD, P27, and H2AX may reflect the pathophysiological mechanisms that underlie AKI and IRI and may act as potential biomarkers for these diseases. The study is unique to investigate the effect of different markers in renal IRI in different age groups of rats.

Keywords: Ischemic Reperfusion Injury, Senescence, Biomarkers, Renal, Kidney Transplantation, Indoleamine 2, 3 dioxygenase (IDO), Manganese Superoxide Dismutase (MnSOD), P27, H2AX.

P6: A PRECLINICAL STUDY FOCUSING ON OXIDATIVE STRESS PARAMETERS ON ADJUVANT ARTHRITIS RAT MODEL TO EVALUATE THE EFFECT OF VARIOUS MOLECULAR WEIGHTS OF HYALURONIC ACID IN MONOTHERAPY AND IN COMBINATION WITH METHOTREXATE

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Background: Hyaluronic acid (HA) has been shown in recent research to have chondroprotective and anti-inflammatory effects in rheumatoid arthritis (1). Objectives: The purpose of this study was to examine HA and its combination with methotrexate (MTX) in rats suffering from adjuvant arthritis (AA).

Methods: In our studies, we used male Lewis rats, and the arthritis was induced by intradermal injection of 0.1 ml suspension of heat-killed *Mycobacterium butyricum* mixed with incomplete Freund's adjuvant at a dosage of 12 mg/ml into the base of a tail of Lewis rats (2,3). These groups of animals were included in the experiment: healthy controls, animals with arthritis that were not treated animals with arthritis who received treatment with HA and MTX, and animals with arthritis who received treatment with HA and MTX combined. Animals received daily doses of 0.5 mg and 5 mg/kg b.w. of HA of varying molecular weights (0.43, 0.99, and 1.73 MDa) alone or combined with methotrexate in an oral dose of 0.3 mg/kg b.w. twice weekly.

Result: We measured the improving effect of HA on antioxidant enzymes in erythrocytes (superoxide dismutase and glutathione peroxidase) and on plasma antioxidant capacity. Further, we discovered that HA decreased the amount of lipid hydroperoxides in plasma, a sign of oxidative damage to lipids developing during arthritis.

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The effect of HA with the highest molecular weight was the most notable not only on the oxidative stress parameters, but also on inflammatory markers and the main biometric markers. Conclusion: HA and MTX therapy together prevented the development of arthritis in rats more successfully than MTX alone. There is a possibility that this finding will lead to improved treatments for rheumatoid arthritis patients after its clinical implementation.

Keywords: arthritis; hyaluronic acid; Lewis rats; methotrexate; oxidative stress.

P7: DIETARY SUPPLEMENTATION WITH SANOLIFE[®] PRO-F PROBIOTIC PROTECTS THE NILE TILAPIA; OREOCHROMIS NILOTICUS; DURING THERMAL STRESS

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Background: The potential role of probiotics has been investigated under undesirable temperature fluctuations known to occur in aquaculture facilities. **Objectives:** This research aimed to evaluate the efficacy of mixed *Bacillus* strains probiotic supplements in mitigating acute thermal-induced stress in Nile tilapia. **Methods:** Three experimental fish groups (n =180) with mean weights of 45 ± 2 g were used in this study. The first additive-free basal diet group was served as a control, whereas the other two groups; experiment groups; were fed a commercial compound containing a mixture of selected *Bacillus* strains at 0.5, and 1%/ kg diet, for 8 weeks. After the feeding period, some immunological parameters; stress biochemical markers, and antioxidant parameters, as well as stress-related genes, and histo-pathological changes in fish, were assessed before and after exposure to the thermal stress. **Results:** Before the heat challenge, our results showed lower serum levels; triglycerides and cholesterol, and tissue malondialdehyde (MDA); along with significantly increased superoxide dismutase (SOD), and catalase (CAT) enzymes activity in the fish group that was fed *Bacillus* probiotic at 0.5% compared to the control group. No notable changes in other serum indices; glucose, cortisol, and lactate, immunity parameters, hepatic, and renal stress indices, as well as stress-related genes; were observed in most of the probiotic groups' fish. When Nile tilapia was exposed to heat stress, and supplemented with *Bacillus* probiotic in the diet, a significant decrease in serum biochemical indices values; ALT, AST, LDH, total protein, albumin, urea, creatinine, triglycerides, cholesterol, glucose, and cortisol with tissue oxidative stress MDA levels, and HSP70 mRNA expression was recorded compared to the stressed control group. In addition, a marked rise in the immune response, and enzymatic antioxidant ability (SOD, CAT) with GST and GPx mRNA expression, was shown compared with the stressed control group. No pathological alterations were observed in the spleens and brains of fish pre- and post-heat exposure. **Conclusion:** Diet supplementation of *Bacillus* species has a potential to combat the deleterious effects of heat shock in Nile tilapia. **Keywords:** *Bacillus* probiotic; gene expression; heat shock; histopathology; immune response; Nile tilapia.

P8: BACTERIAL CO-INFECTION AS A POTENTIAL THREAT TO FARMED FLATHEAD GREY MULLET (MUGIL CEPHALUS): PHENOTYPIC AND MOLECULAR DIAGNOSIS, HISTOPATHOLOGY, IMMUNITY RESPONSE, AND IN VITRO ANTIBACTERIAL EVALUATION

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Background: The Flathead Grey Mullet (*Mugil cephalus*) has gained economic importance in Egypt, but its aquaculture is facing challenges due to many environmental stressors such as contamination and bacterial infections. *Vibrio* species cause vibriosis, posing a significant threat to the fish's health. *Vibrio alginolyticus* is responsible for mass mortalities. Enterobacter species in polluted water are associated with fish infections. Objectives: Identification of the pathogenic bacteria affecting striped mullet in Bahr El-Baqar, Egypt; assessing the water quality parameters during fish mortalities and evaluation of the antibiotic susceptibility of the bacterial isolates.

Methods: This study was conducted in Bahr El-Baqar, Egypt, to examine *Mugil Cephalus* obtained from three different fish farms. The study involved clinical assessments and an in-depth analysis of the water quality. Bacteriological isolation procedures were implemented by culturing and identifying the samples. To identify the species of *Vibrio* and *Enterobacter*, a PCR assay targeting the 16S rRNA gene was carried out, followed by a phylogenetic analysis based on the generated sequences.

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In addition, the histopathological analysis was conducted on tissue sections. The antibiotic susceptibility of the identified strains was evaluated using the agar diffusion method with selected antimicrobials.

Results: The Flathead Grey Mullet (*Mugil cephalus*) showed signs of anorexia, opercular, and buccal hemorrhages. The water quality analysis indicated decreased oxygen levels and elevated ammonia, nitrite, and heavy metal concentrations. The bacteria isolated from fish included *V. alginolyticus* (50%), *V. cholerae* (25%), *Enterobacter* species (10%), and other mixed infections (15%). The histopathological examination showed changes in the brains, livers, spleens, gills, and buccal cavities. The antibiotic susceptibility testing indicated that *V. alginolyticus* isolates were sensitive to norfloxacin, florfenicol, and ciprofloxacin, but were resistant to amoxicillin. *Enterobacter* species showed sensitivity to doxycycline but expressed resistance to erythromycin. Conclusion: In Bahar El-Baqar, Egypt, sewage, and agricultural waste have caused high rates of vibriosis and *Enterococcus* in farmed grey mullet. The main culprits; *V. alginolyticus*, *V. cholerae*, and *E. cloacae*; caused septicemia and immunological changes. The heavy metal pollution monitoring is necessary to reduce the infections and ensure food safety regulations in Egypt's aquaculture sector.

Keywords: antibiotic susceptibility; *Enterobacter*; Histopathology; striped mullet; vibriosis; water quality.

P9: POLYPHASIC CHARACTERIZATION OF AN EMERGING VIBRIO HARVEYI STRAIN ASSOCIATED WITH MORTALITIES IN EUROPEAN SEABASS (DICENTRACHUS LABRAX) FARM IN ALEXANDRIA, EGYPT

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Background: *Vibrio harveyi* is a Gram-negative bacterium that can be found in marine environments worldwide. Although it was once considered an opportunistic pathogen, it has now become a significant threat to the fishing industry. The disease caused by *V. harveyi* is known to cause systemic infections that can quickly lead to heavy mortality if left untreated and resulting in significant economic losses. Controlling *V. harveyi* infections can be challenging, as the bacterium is highly adaptable and can survive in a variety of conditions. Objectives: Investigation the biochemical and molecular characterization of *V. harveyi* strain, that can help to distinguish strategies to control the mortalities between seabass farms Methods: One hundred twenty European Sea bass (*Dicentrarchus labrax*) in Alexandria, Egypt, Seabass obtained from mariculture floating cages, the water parameters were measured (salinity was 10.06 ppm). Both healthy and moribund Seabass were examined in detail to identify the clinical, postmortem, and bacteriological aspects of the disease. The comprehensive study of identification that involved morphological character with Gram stain, motility, oxidase, citrate utilization, acid and gas fermentation by API* 20E system, further characterization of its 16s rRNA was done by PCR, gene sequencing, and examined the isolate against *Vibrio* state O/125, in addition to performing antibacterial discs sensitivity and histopathological examination. The study aimed to gain a better understanding of the disease affecting Seabass and to identify potential treatments to mitigate its effects.

Results: The infected fish displayed many symptoms, including anorexia, corneal opacity, ulcers and discoloration of the skin, hemorrhages in the base of dorsal and tail fins, and ascites.

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Internal examination showed severe congestion in the liver. They also carried out antimicrobial testing and found that the strain was sensitive to sulfamethoxazole-trimethoprim and resistant to ampicillin and tetracycline. By sequencing the genes and conducting phylogenetic analysis based on the 16s rRNA sequence, *V. harveyi* strain identified in this study (accession no. MW241595) had a 100% match with the 16S rRNA gene of *V. harveyi*. Damage tissue alteration was examined through routine histopathological assays. Conclusion: This study found that there have been increasingly frequent outbreaks caused by the emerging pathogen *V. harveyi* among mariculture in recent years. Phenotypic and genotypic characterization can be a useful epidemiological tool for the laboratory diagnosis of *Vibrio* species. The recommendation is to implement biosecurity and decisive veterinary hygienic regulation to control such infections. The careful utilization of antibiotics in the fisheries industry has become mandatory to prevent antibiotic residues and mitigate significant losses arising from multidrug-resistant *V. harveyi* strains.

Keywords: genotypic; histopathology; sea bass; *V. harveyi*; vibriosis.

P10: STUDY OF SOME UDDER CHARACTERS AND SONOGRAPHY FOR MESOPOTAMIAN BUFFALO IN MIDDLE OF IRAQ

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This is the first study of buffalo udder and teat sonography in Iraq. It has been launched to fulfill (I.B. F) requirements for a national project in 2021. This study was undertaken in Abu Graib district enclosed three buffalo breeders at duration from June to October 2023. There are tens buffalo divided to two groups the first was five primiparous and five multiparous animals (3 to 7 births). The numbers of buffaloes among breeders ranged between 35 to 100 head and using the SAS program for the statistical analysis of the collected data. The characters under investigation included teat canal length (TCL), teat diameter (TD), teat cistern diameter (TCD), and teat wall thickness (TWT). Moreover, the effect of morning milking and evening milking, as well as before and after milking on these characters was studied using an ultrasound device (CHISON ECO3 EXPERT VET) using a macro convex transducer model: MC5V-A And. B-mode real-time Ultrasonography with a 5-7.5 MHz using (mm) for measurements. The results of the current study showed that there were significant differences among the single birth group in the length of the teat canal (TCL) in both cases; before and after/morning and evening milking. ($P \leq 0.05$) where the values which has increased from 7.78 to 10.04 mm (in the morning milking) and also from 8.22 to 10.22 mm for (evening milking). The opposite of this occurs in the teat diameter (TD), where the averages decreased from 36.86 to 26.58 mm for the measurements of before and after/ morning milking and 35.10 to 25.68 mm for before and after evening milking. No significant differences were dedicated regarding the milking time (morning or evening). A significant reduction of the teat cistern diameter was noticed 23.40 to 17.28 mm for before and after/ morning milking. In evening milking, the values were 20.90 to 17.36 mm. With regard to multiple births, a significant difference was dedicated at a significant level of ($P \leq 0.05$) for the first three characters, which are TCL, TD, TCD While no significant differences appeared in the TWT this applies to morning and evening milking, as well as before and after milking. There was a significant decrease in the average values of the trait TD in the morning milking from 49.52 to 30.98 mm. While in evening (before and after) milking it was from 47.94 to 30.32 mm. The same was true for the TCD trait. Traditional management of buffalo in Iraq through the manual milking is a momentous challenge to udder hygiene; this research will aid in recognition of the possibility of using milking machines in future, also, through this study, we aspire to prove the relationship of genetic inheritance to the morphological characters of the teats and udders of buffalo.

P11: EXPRESSION OF A TRANSGENE IN-FRAME WITH A NEWCASTLE DISEASE VIRUS PROTEIN INCREASES THE TRANSGENE EXPRESSION AND STABILITY

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Background: NDV has been used as a virus vector for more than 2 decades, yet the stability of its payload gene (transgene) expression is not enough for the virus to be applied as a vector vaccine infield condition (mass application). About 10% of the recombinant NDV expressing a foreign gene was recorded to lose the foreign protein expression after 2–3 passages. A new approach is required to increase the stability of transgene expression by NDV vector to allow its application in the field conditions. Objectives: Application of a novel approach for transgene expression by NDV vector in frame with NDV genes and evaluation of its effect on the transgene expression stability compared to the conventional expression technique.

Methods: Seven constructs of NDV vector were designed to express the avian influenza virus (AI) H5N1 HA gene as a fusion peptide with the NDV proteins: NP, M, F, and HN, using Porcine teschovirus 2A (P2A) self-cleaving peptide. The recovered constructs were evaluated against the NDV vector expressing the same gene from the corresponding genomic site as a separate transcription unit (conventional expression technique). All constructs were evaluated in terms of growth kinetics, transgene expression, transgene incorporation in the recombinant NDV vector, and stability after 11 passages in specific pathogen-free embryonated chicken eggs. The HA expression stability was evaluated in mammalian cells using single-cell single-cycle infection and calculating the rate of HA expression in 400 infected cells per virus passage. **Results:** Only two constructs of NDV vectors with the HA gene fused to the HN gene C-terminal were recoverable. Expression of avian influenza HA from the transcription unit of the NDV HN gene increases its expression stability from 90% to 99% of infected cells after 10 passages.

P11: EXPRESSION OF A TRANSGENE IN-FRAME WITH A NEWCASTLE DISEASE VIRUS PROTEIN INCREASES THE TRANSGENE EXPRESSION AND STABILITY

Conclusion: Expression of AI HA by NDV vector lowers its HN protein content more than its wild type. Expression of a transgene in-frame with an NDV gene improves its expression stability rather than being expressed as a separate transcription unit.

Keywords: Avian influenza vaccine; NDV vector; Oncolytic virus; Reverse Genetics.

P12: AURICULAR CARTILAGE REGENERATION USING DIFFERENT TYPES OF MESENCHYMAL STEM CELLS IN RABBITS

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Background: Cartilaginous disorders comprise a wide range of diseases that affect normal joint movement, ear and nose shape; and they are great social and economic impact. Mesenchymal stem cells (MSCs) provide a promising regeneration alternative for the treatment of degenerative cartilaginous disorders. Objectives: This study aimed to compare the therapeutic potential of different types of lasers activated MSCs to promote auricular cartilage regeneration. Methods: Twelve adult rabbits were allocated equally into four groups, all animals received a surgical mid auricular cartilage defect in one ear; Group I (Positive control) was injected sub-perichondrially with phosphate-buffered saline (PBS), Group II injected adipose-derived MSCs (ADMSCs), Group III (received bone marrow-derived MSCs (BMMSCs), and Group IV received ear MSCs (EMSCs) in the defected ear. The auricular defect was analyzed morphologically, histopathologically, and immunohistochemically after 4 weeks. In addition, a quantitative real-time polymerase chain reaction was used to examine the expression of collagen type II (Col II) and aggrecan as cartilage growth factors. Results: The auricles of all treatments appeared completely healed with smooth surfaces and similar tissue color. Histopathologically, defective areas of the control group, ADMSCs, and EMSCs treated groups experienced a small area of immature cartilage.

P12: AURICULAR CARTILAGE REGENERATION USING DIFFERENT TYPES OF MESENCHYMAL STEM CELLS IN RABBITS

While BMMSCs group exhibited typical features of new cartilage formation with mature chondrocytes inside their lacunae and dense extracellular matrix (ECM). In addition, the BMMSC group showed a positive reaction to Masson's trichrome and orcein stains. In contrast, control positive, ADMSC, and EMSC groups revealed faint staining with Masson's trichrome and Orcein. Immunohistochemically, there was an intense positive S100 expression in BMMSCs (with a significant increase of area percentage +21.89 ($P < 0.05$), a moderate reaction in EMSCs (with an area percentage + 17.97, and a mild reaction in the control group and ADMSCs (area percentages + 8.02 and +11.37, respectively). The expression of relative col II and aggrecan was substantially highest in BMMSCs (± 0.91 and ± 0.89 , respectively). While control positive, ADMSCs and EMSCs groups recorded ($\pm 0.41: \pm 0.21$, $\pm 0.6: \pm 0.44$, $\pm 0.61: \pm 0.63$) respectively.

Conclusion: BMMSCs showed the highest chondrogenic potential compared to ADMSCs and EMSCs and should be considered the first choice in the treatment of cartilaginous degenerative disorders.

Keywords: auricular cartilage defects; bone marrow; ear; mesenchymal stem cells; rabbit.

P13: EFFECT OF HORSETAIL (EQUISETUM ARVENSE) LEAVES EXTRACT ON CYSTITIS AND STRUVITE CALCULI INVOLVED IN FELINE LOWER URINARY TRACT DISEASE

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Background: Natural-based, safe, and rapidly acting urinary medication for cystitis (inflammation of the urinary bladder) is a critical issue facing small animal physicians. Feline lower urinary tract disease (FLUTD) has increasing attention for innovative diagnostic and therapeutic modalities. Horsetail (*Equisetum arvense*) is a traditional herb that has numerous previously proven medical properties such as anti-inflammatory, diuretic, anti-microbial, hepatoprotective, and antioxidant. **Objectives:** This study evaluated both diuretic and anti-inflammatory actions of horsetail against struvite crystals and cystitis in non-obstructive cases of FLUTD in cats. **Methods:** Twelve dry food-adapted tom cats were admitted to the teaching hospital due to signs of pollakiuria, dribbling of urine, hematuria and remaining in the posture of urination for longer period. Physical examination revealed suspected FLUTD due to cystitis and urinary calculi. Urinalysis confirmed the triple phosphate (struvite) crystals, and ultrasonography confirmed the evidence of cystitis. After clinical resuscitation, cats were exposed to medical boarding for 21 days and classified randomly according to treatment into two groups. The first group (G1) was administered the urinary herbal solution No. 1 (UHS-1) which consisted of vitamin C, ammonium chloride, half a-bar leaves extract, sodium acid phosphate, hexamine, and horsetail leaves extract. The second group (G2) was administered the urinary herbal solution No. 2 (UHS-2) which consisted of the same components of UHS-1 without horsetail extract.

P13: EFFECT OF HORSETAIL (EQUISETUM ARVENSE) LEAVES EXTRACT ON CYSTITIS AND STRUVITE CALCULI INVOLVED IN FELINE LOWER URINARY TRACT DISEASE

Urinalysis was carried out weekly, and ultrasonography was repeated after treatment. Results: Clinical signs in G1 disappeared after 4 days, however, G2 extended to 7 days. Urine pH in both groups significantly decreased after 14 days. Struvite crystals completely disappeared in G1 after 14 days, while G2 extended to 21 days. Ultrasonography showed a normal urinary bladder in 5 cases of G1, but the sixth case still had mild cystitis, however, 2 cases only in G2 revealed a normal urinary bladder, but the remaining 4 cases showed mild cystitis. **Conclusion:** A combination of anti-lithic preparations with horsetail leaf extract can accelerate recovery in FLUTD-affected cats. Further investigations about the anti-inflammatory properties of horsetail are highly recommended regarding other parts of the herb, combination with other herbs or other chemical urinary preparations, and application in different animal species using diverse dosage rates.

Keywords: Equisetum arvense; cystitis; Horsetail; Feline lower urinary tract disease (FLUTD); struvite, triple phosphate.

P14: COMPARE THE EFFICACY OF CORNEAL HEALING BETWEEN AUTOLOGOUS SERUM AND EYE DROPS PLATELET RICH PLASMA IN DOGS

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Background: autologous blood derivatives are used for the treatment of corneal wounds in dogs. Objectives: compare the efficacy of AS with PRP eye drops for corneal wounds in dogs.

Methods: experimental. Results: E-PRP had a superior effect over AS in time and quality of regenerated epithelial tissues in corneal wounds. Conclusion: E-PRP showed a significant improvement over AS in healing time and quality of regenerated epithelial tissue in the treatment of corneal wounds in dogs.

Keywords: platelets-rich plasma (E-PRP); Autologous serum (AS)

P15: THE POTENTIAL AMELIORATIVE EFFECT OF MELATONIN ON ALUMINUM OXIDE NANOPARTICLE TOXICITY IN BRAIN TISSUE AND SPINAL CORD OF ADULT MALE ALBINO RATS

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Background: Aluminum oxide nanoparticles (AL₂O₃ NPs) have been widely used in vaccine manufacture, food additives, human care products, and cosmetics. However, they also have adverse effects on different organs. Melatonin is a potent antioxidant, particularly against metals by forming melatonin-metal complexes. Objectives: investigate the protective effects of melatonin against Al₂O₃ NP-induced toxicity in the rat brain tissue (cerebrum, cerebellum, and hippocampus) and spinal cord (grey matter and white matter) through demonstration of histopathological lesions in 2 organs with the light microscope and electron microscopy in the spinal cord only, biochemical analysis and immunohistochemical expression of caspase 3. **Methods:** Forty adult male rats were allocated into four groups: the control, Al₂O₃ NP (received 30 mg/kg body weight Al₂O₃ NPs), melatonin plus Al₂O₃ NP (received 30 mg/kg Al₂O₃ NPs + 10 mg/kg melatonin), and melatonin (received 10 mg/kg melatonin) groups. All treatments are administrated orally for 28 days. The rats were sacrificed, and samples from various brain regions (cerebrum, cerebellum and hippocampus) and spinal cord were subjected to biochemical analysis as malondialdehyde, glutathione, β -amyloid 1-42 peptide, acetylcholinesterase, and β -secretase-1 expression in brain and malondialdehyde, catalase, superoxide dismutase and 8-hydroxydeoxyguanosine levels in spinal cord, histopathological, and immunohistochemical analysis of caspase 3.

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Background: Aluminum oxide nanoparticles (AL₂O₃ NPs) have been widely used in vaccine manufacture, food additives, human care products, and cosmetics. However, they also have adverse effects on different organs. Melatonin is a potent antioxidant, particularly against metals by forming melatonin-metal complexes. Objectives: investigate the protective effects of melatonin against Al₂O₃ NP-induced toxicity in the rat brain tissue (cerebrum, cerebellum, and hippocampus) and spinal cord (grey matter and white matter) through demonstration of histopathological lesions in 2 organs with the light microscope and electron microscopy in the spinal cord only, biochemical analysis and immunohistochemical expression of caspase 3. **Methods:** Forty adult male rats were allocated into four groups: the control, Al₂O₃ NP (received 30 mg/kg body weight Al₂O₃ NPs), melatonin plus Al₂O₃ NP (received 30 mg/kg Al₂O₃ NPs + 10 mg/kg melatonin), and melatonin (received 10 mg/kg melatonin) groups. All treatments are administrated orally for 28 days. The rats were sacrificed, and samples from various brain regions (cerebrum, cerebellum and hippocampus) and spinal cord were subjected to biochemical analysis as malondialdehyde, glutathione, β -amyloid 1-42 peptide, acetylcholinesterase, and β -secretase-1 expression in brain and malondialdehyde, catalase, superoxide dismutase and 8-hydroxydeoxyguanosine levels in spinal cord, histopathological, and immunohistochemical analysis of caspase 3.

P15: THE POTENTIAL AMELIORATIVE EFFECT OF MELATONIN ON ALUMINUM OXIDE NANOPARTICLE TOXICITY IN BRAIN TISSUE AND SPINAL CORD OF ADULT MALE ALBINO RATS

Results: Al₂O₃ NP administration increased malondialdehyde, β -amyloid 1–42 peptide, acetylcholinesterase, and β -secretase-1 expression in brain tissues, inhibited the glutathione levels in brain tissues. NPs significantly increased malondialdehyde and 8-hydroxydeoxyguanosine and inhibited catalase and superoxide dismutase levels in spinal cord tissues with histopathological alterations including vacuolation of the neuropil, enlarged pericellular and perivascular spaces, vascular congestion, neuronal degeneration, and pyknosis in different brain areas and gray matter of the spinal cord with vacuolation, ballooning, and fusion of myelin sheaths with axonal degeneration and sometimes axonal disappearance in the white matter of the spinal cord with severe immunohistochemical expression of caspase3. The Al₂O₃ NPs plus melatonin-treated group revealed less severe alterations as indicated by the lesser extent of neuropil vacuolations, pericellular and perivascular spaces, and vascular congestion. Furthermore, most neurons appeared nearly normal with basophilic cytoplasm and lightly stained nuclei, whereas degeneration and pyknosis of only a few neurons were observed in brain tissue and in the spinal cord exhibited partial recovery in some of the myelinated nerve fibers that myelin appeared normal and intact with normal axoplasm, other myelinated nerve fibers appeared degenerated with dispersed myelin sheaths and degenerated axoplasm with moderate immunohistochemical expression. The control group and melatonin-only treated group demonstrated normal histological structure and biochemical test levels and immunohistochemical analysis of caspase3.

Conclusion: Exposure to Al₂O₃ nanoparticles has been found to induce neurotoxicity in rats through inducing oxidative stress, stimulating AChE activity, and the expression of β -amyloid 1–42 peptides and BACE1 mRNA with histopathological alterations in brain and spinal cord. A strong caspase-3 immunostaining was also observed. Melatonin can diminish the neurotoxic effects induced by NPs through its anti-inflammatory, anticancer effects, and antioxidant properties.

Keywords: aluminum oxide nanoparticles; apoptosis; β -Amyloid 1–42; brain; catalase; melatonin; spinal cord.

P16: INFLUENCE OF SAMBONG (BLUMEA BALSAMIFERA) LEAVES EXTRACT ON CYSTITIS AND AMORPHOUS URATES CAUSING FELINE LOWER URINARY TRACT DISEASE

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Background: Treatment of feline lower urinary tract disease (FLUTD) poses a great concern in small animal clinics. Sambong (*Blumea Balsamifera*) is an ayurvedic herb composed of numerous phytochemical constituents that have previously evidenced biological actions mainly diuretic, anti-lithic, and anti-inflammatory. Objectives: This study investigated the effect of Sambong (*Blumea Balsamifera*) leaf extract on cystitis and amorphous urates in non-obstructive cases of FLUTD.

Methods: Ten male cats were admitted to the teaching hospital, suffering from dysuria, pollakiuria, stranguria, and dribbling of urine. Clinical examination revealed a painful urinary bladder with evidence of partial urine retention and suspected acute cystitis which is confirmed in eight cases via ultrasonography. Urine samples were collected for urinalysis which showed amorphous urates (+++) with acidic pH. After clinical stabilization, cats were subjected to medical boarding for 14 days and classified according to treatment into two groups each one contained 5 cats; 4 of them suffering from confirmed cystitis. The first group (G1) was administered a urinary alkalinizing solution No. 1 (UAS-1) which is composed of sodium bicarbonate, potassium citrate, piperazine citrate, and omega-3. The second group (G2) was administered the urinary alkalinizing solution No. 2 (UAS-2) which is typically UAS-1 in addition to Sambong leaves extract. Both UAS-1 and UAS-2 were administered orally twice daily at a dosage rate of 1 ml/kg body weight for 14 days. Ultrasonography and urinalysis were repeated after 14 days.

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Results: Urine pH significantly increased (7.26 ± 0.06) in both groups. Amorphous urates disappeared from the urine of G2, while 2 cases in G1 showed urates (+). Ultrasonography of the four cases of cystitis in G2 showed a return to the normal urinary bladder, while only one case in G1 returned to normal, however, the other 3 cases still suffered from a degree of cystitis due to thickening in the bladder wall, and abundant precipitate. Conclusion: The addition of Sambong leaf extract in urinary medications has a promising positive effect on treating cystitis and amorphous urates. These preliminary findings require further investigations regarding the anti-inflammatory and anti-lithogenic actions of Sambong considering other parts of the herb, different dosage rates, combination with other urinary medications, and diverse animal species.

Keywords: Blumea Balsamifera; cystitis; Feline lower urinary tract disease (FLUTD); Sambong; urates.

P17: RESIDUAL CONTAMINATION AND BIOFILM FORMATION BY GRAM-NEGATIVE BACTERIA IN POULTRY HOUSES ISOLATED FROM DRINKING WATER SYSTEMS, FANS, AND FLOORS

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Background: Evaluation of the hygienic status of poultry houses through bacterial and fungal counts. Two broiler housing facilities were investigated for microbiological status during the production cycle days 7, 21, and 31, and after the disinfection process. **Objectives:** To ensure a healthy environment for poultry, cleaning, and disinfection shouldn't be overlooked throughout the production process. Few studies examined the hygienic status of broiler house surfaces before and after disinfection. **Methods:** Twenty-seven water samples were collected; 18 from water lines using the sponge stick method, 3 from major water sources, and 6 from the cooling pad water; in addition, 25 dust samples were collected from fans and floors. The samples were analyzed for the presence of aerobic bacteria, coliforms, *Pseudomonas* species, fungi, and yeast. After the disinfection process, 18 swabs were taken from water lines, floors, and fans to assess the residual microbial counts and biofilm formation using Tube and Tissue Culture Plate methods. **Results:** The microbial count was higher at the water lines entrance than at the exit. The readings at the entrance, and the exit were recorded. The total colony count was 342, and 23.99 CFU per 106/20 cm², the total coliform was 36, and 0.97 CFU per 106/20 cm², *Pseudomonas* was 257.50 and 12.61 CFU per 106/20 cm², and the fungal count was 10.65, and 1.97 CFU per 105/20 cm², respectively. A variety of bacteria were isolated and identified using VITEK 2 as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Proteus mirabilis*. Then, the isolates were examined for their ability to biofilm formation. **Conclusion:** Water lines' biofilms are hard to be removed completely by acid flushing. So, for the cooling pads' tanks, periodical maintenance of water lines, with continuous water sanitation is preferred especially by using chlorine compounds. The dust on the floor and fans affects the air quality. Consequently, continuous sweeping and cleaning of fans and floors is preferred to avoid microbial spreading in the air.

Keywords: biofilm; broiler farms; drinking water system; dust; microbial contamination.

P18: CYSTICERCUS BOVIS-INDUCED LIVER LESIONS IN SLAUGHTERED BEEF CATTLE IMPORTED FROM SUDAN

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Background: Bovine cysticercosis refers to the infection of cattle with *Cysticercus bovis*, the larval stage of the human tapeworm, *Taenia saginata*. It is a worldwide distributed disease, particularly in African countries, where it badly affects the economy and public health. Bovine cysticercosis seldom causes clinical illness and it could be primarily diagnosed via slaughterhouses through visual inspection and incision of muscles, particularly internal and external masseter muscles, diaphragm, tongue, and heart which were regarded as predilection sites. Objectives: Report the migration of *Taenia saginata* larvae (*Cysticercus bovis*) to the liver of Sudanese beef zebu cattle and describe the pathological changes induced by them. Methods: At Abu Simbel abattoir (22° 20' 12.5628" N and 31° 37' 31.9152" E.), Aswan Governorate, Egypt. 1575 slaughtered beef zebu cattle aged from two to three years were inspected and examined with particular attention to liver affections. Small sections of cubic shapes ranging from 2-3 cm in length were taken from all lesions, photographed by digital camera, and fixed in 10% neutral buffer formalin with PH 6.8 – 7 for preservation. Sections with 3-5μ thickness were taken from fixed specimens, processed routinely, stained by Haematoxylin and Eosin, examined by a bright field light microscope, and imaged using a Sc30 Olympus camera.

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Masson's trichrome stain was used in some sections as a special stain. Results: The prevalence* rate of liver lesions was 10.9% (172 / 1575). The incidence* of cysticercosis was 9.3% (16 /172) from the diagnosed lesions. Specimens were classified as those having single cysts (5 specimens) and multiple cysts (11 specimens). The total cyst count was 44. Of these, 63.6% were viable and 36.3% were degenerated. The morphological appearance of the liver varied from normal structure and consistency to swollen with rounded borders. Histopathologically, a fully developed bladder-like cyst with its invaginated scolex was observed in liver tissues resulting in necrotic changes in hepatocytes, fibrosis, and inflammatory infiltrate Conclusion: Imported animals from Sudan are an important source of some zoonotic diseases.

Keywords: Cysticercus bovis; liver affections; Taenia saginata; zoonotic parasites.

P19: EFFECT OF THE MICROGLIAL PURINERGIC RECEPTOR P2Y12 ON THE EFFICIENCY OF BETA-AMYLOID IMMUNOTHERAPY

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Background: Microglia, the main immune cells of the central nervous system (CNS), are instrumental in mediating the efficiency of A β immunotherapy by promoting beta-amyloid clearance and forming a protective cellular barrier around beta-amyloid plaques. The exact signaling pathways that mediate this A β antibody-induced effect in microglia have remained elusive. P2Y12, which is expressed by microglia in the CNS and belongs to the family of purinergic receptors, is involved in important microglial functions in the healthy brain, including directed cell process movement, chemotaxis, and phagocytosis. Furthermore, previous data suggests that blockade of P2Y12 receptor in microglia causes accelerated disease progression in mouse models with AD-like pathology and is associated with dysfunctional phagocytic activity in microglia. **Objectives:** This project aimed at elucidating whether microglial P2Y12 is involved in mediating microglial A β clearance during A β immunotherapy. **Methods:** To this end, microglial cell culture and ex vivo experiments using murine cerebral sections from AD mouse models were combined utilizing confocal and live-cell imaging. **Results:** P2Y12 receptor boosted anti-A β antibody mediated A β uptake by cultured microglia. In addition, P2Y12 depletion restricted antibody-mediated microglial amyloid plaque clearance in an ex vivo model. **Conclusion:** Based on our results, we conclude that - in the presence of anti-A β antibody - P2Y12 contributes to A β -induced chemotaxis and A β uptake by cultured microglia, and amyloid plaque clearance by microglia in murine cerebral sections harboring amyloid beta pathology.

Keywords: microglia; anti-A β antibody; P2Y12; immunotherapy

P20: SEROLOGICAL IMMUNE RESPONSE OF MULTIVALENT INACTIVATED AVIAN INFLUENZA VACCINES IN COMMERCIAL BROILER AND BROILER BREEDER CHICKENS

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Background: Avian influenza (AI) of H5 and H9 subtypes causes severe economic losses to poultry industry all over the world in the last 3 decades. Both subtypes were detected in Egypt in 2006 and 2011 for H5 and H9 respectively, since then vaccination with inactivated vaccines has been implemented to control the disease.

Objectives: Evaluation of the serological immune response of multivalent inactivated AI vaccines in commercial broiler and broiler breeder chickens in Egypt
Methods: Serum samples were collected from 25 broiler farms and 57 broiler breeder farms after vaccination with multivalent inactivated AI vaccines either once or multiple times and HI assay was performed by using H9N2, H5N1 and H5N8 antigens.

Results: Twenty-five broiler flocks vaccinated once at the age of 5-8 days old and serum samples tested at least 3 weeks post-vaccination (PV) showed HI titers for H9N2 ranged from 4.0-5.9 log₂, for H5N1 ranged from 2.1-6.1 log₂ and for H5N8 was 1.8-6.4 log₂. Nineteen broiler breeder flocks were vaccinated once at 7 days old and serum samples were tested 3 weeks PV till 10 weeks PV; the HI titers were increased over time and the highest titers were observed at 10 weeks PV for H9N2, H5N1, and H5N8 (9.6, 8.5 and 8.8, respectively). Fifteen broiler breeder flocks vaccinated twice showed highest HI titers of 9.6, 9.7, and 10 log₂ for H9N2, H5N1, and H5N8, respectively.

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Twenty-three broiler breeder flocks vaccinated 3 times showed a protective HI titer over 26 weeks after the third vaccination for the 3 different avian influenza viruses. Conclusion: We observed that the use of multivalent vaccines for AIV and NDV prepared from local isolates gives high HI titers and can provide protection from the adverse effects of these viral infections for broilers and broiler breeder flocks.

Keywords: Avian influenza; Egypt; H5N1; H5N8; H9N2.

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