ICOVRI
THE TENTH INTERNATIONAL CONFERENCE OF THE VETERINARY RESEARCH INSTITUTE

ICOVRI 10

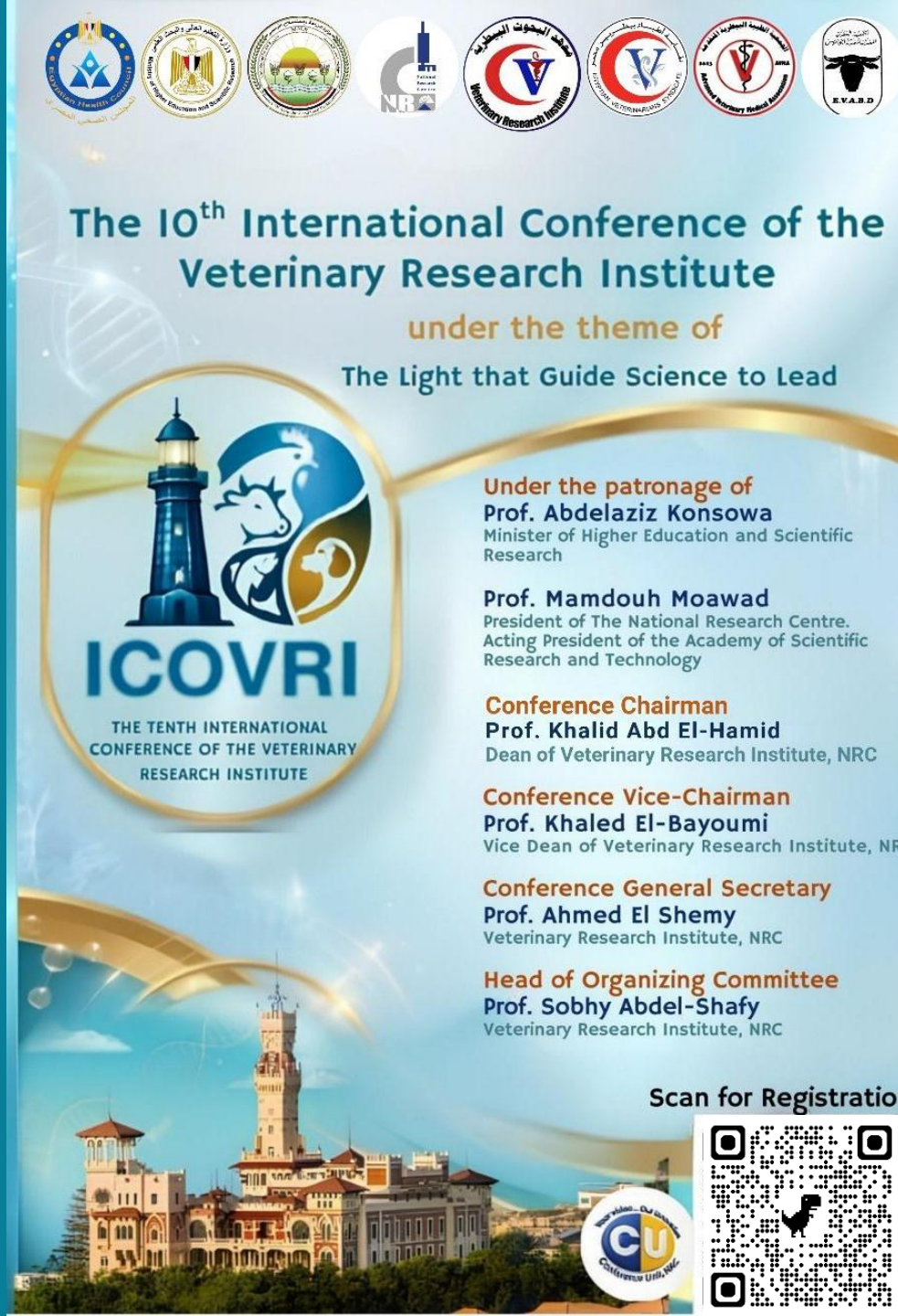
CONFERENCE PROGRAM

The Tenth International Conference of the Veterinary Research Institute

The Light that Guides Science to Lead

27–30 SEPTEMBER 2026 | EGYPT

27 September • Hilton Heliopolis, Cairo
28–30 September • Tulip Sidi Gaber, Alexandria



Message from the Conference Chairman

It is a profound honor to welcome you to the 10th International Conference of the Veterinary Research Institute (10 ICOVRI). As we gather in Egypt, our mission transcends traditional boundaries, driven by our core theme: **"The Light that Guides Science to Load".**

At the heart of this year's scientific program is the Immune Foundation, which serves as the bedrock of our understanding and response to global health challenges. By prioritizing veterinary immunology and biotechnology, we aim to strengthen the one health approach-recognizing the health of animals, people, and our shared environment is inextricably linked. Through this conference, we aspire to illuminate new pathways in vaccine development and diagnostic innovation, ensuring that science remains the steady light leading us toward a healthier and more resilient future for all.

Prof. Khalid Abd El-Hamid
Dean of Veterinary Research Institute
& Conference Chairman

رســـــالة رئيس المـــــؤتمر

إنه لشرف عظيم أن نرحب بكم في المؤتمر الدولي العاشر لمعهد بحوث الطب البيطري (10 ICOVRI) ومع اجتماعنا هنا في مصر، فإن رسالتنا تتجاوز الحدود التقليدية، مسترشدين بمحورنا الرئيسي: "النور الذي يهدي العلم إلى القيادة."

ويأتي الأساس المناعي في صميم البرنامج العلمي لهذا العام، باعتباره الركيزة الأساسية لفهمنا للتحديات الصحية العالمية والاستجابة لها. ومن خلال إعطاء الأولوية لعلم المناعة البيطري والتكنولوجيا الحيوية، نسعى إلى تعزيز نهج "الصحة الواحدة(One Health) "، انطلاقًا من إدراكنا للترابط الوثيق بين صحة الحيوانات وصحة الإنسان والبيئة المشتركة التي نعيش فيها.

ومن خلال هذا المؤتمر، نطمح إلى إضاءة مسارات جديدة في مجال تطوير اللقاحات والابتكار في وسائل التشخيص، بما يضمن بقاء العلم نورًا ثابتًا يقودنا نحو مستقبل أكثر صحة وقدرة على مواجهة التحديات وأكثر صمودًا للجميع.

الأستاذ الدكتور/ خالد عبد الحميد

عميد معهد البحوث البيطرية ورئيس المؤتمر

CONFERENCE OVERVIEW

Program at a Glance

A Four-day Program Designed Around the Conference Theme and Scientific Priorities.

DAY 1

27 SEPT

Sunday

CAIRO

- Opening Ceremony
- Honoring
- Keynotes
- Poster Session
- Best Applied Research Competition

DAY 2

28 SEPT

Monday

ALEXANDRIA

- Keynotes (Poultry Health & Vaccines)

DAY 3

29 SEPT

Tuesday

ALEXANDRIA

- Keynotes (Nutrition • Immune Foundation)

DAY 4

30 SEPT

Wednesday

ALEXANDRIA

- Keynotes (One Health , Zoonoses , Advanced Vaccines)
- Closing & Recognition
- Gala Dinner

16 Keynote Lectures

5 Applied Research Prizes

33 Poster

Main Topics

1. Animal reproduction and AI
2. Veterinary Parasitology
3. Vaccines and infectious diseases
4. Food Hygiene
5. Veterinary Microbiology
6. Poultry Diseases
7. Aquatic Diseases
8. Veterinary Surgery
9. Zoonoses

Conference Leadership

- **Conference Chairman**

Prof. Dr. Khaled Abd El-Hameed

- **Conference Vice- Chairman**

Prof. Dr. Khaled El-Bayoumi

- **General Secretary**

Prof. Dr. Ahmed El Shemy

Organizing Committee

- **Prof. Dr. Sobhy Abdel- Shafy (Head of Organizing Committee)**
- **Prof. Dr. Abdelmohsen Mohamed Hammam**
- **Prof. Dr. Nadia M. T. Abu-El Ezz**
- **Prof. Dr. Mona S. Mahmoud**
- **Prof. Dr. Hossam Hassan Hussein Abbas**
- **Prof. Dr. Hesham Hassan Ahmed El-Khadrawy**
- **Prof Dr. Karima Mahmoud**
- **Prof. Dr. Hatem A. Shalaby**
- **Prof. Dr. Ayman Ameen Samy**
- **Prof. Dr. Hussien A. Abouelhag**
- **Prof. Dr. Seham H. M. Hendawy**
- **Prof. Dr. Dina AboelsouedSeptember 26**

- **Prof. Dr. Eman El Dosoky El Shanawany**
- **Assoc. Prof. Doaa Diab Khalaf**
- **Dr. Ahmed S. A. M. Sosa**
- **Dr. Hoda Shaaban Mohamed Abdel-Ghany**
- **Dr. Bassma Said M. Elsawy**
- **Dr. Mohamed Abdelmoghny Ramadan Helal**
- **Dr. Walaa Abdallah Gad**
- **Eng. Rahma Mosaad**

Session Chairs

- **Dr. Amr Kandil**
- **Dr. Nima Saeed Abid**
- **Prof. Dr. Muhammad Munir**
- **Prof. Dr. Hatem Salah Eldin**
- **Prof. Dr. Khaled El -Bayomi**
- **Prof. Dr. Awad Abdel Hafez**
- **Prof. Dr. Hossam Hassan**
- **Prof. Dr. Hesham El Khadrawy**
- **Prof. Dr. Ayman Ameen Samy**
- **Prof. Dr. Magdy Elkady**
- **Prof. Dr. Mounir Iqbal**
- **Prof. Dr. Abdel Mohsen Hammam**
- **Prof. Dr. Mona Said**
- **Prof. Dr. Nadia Talaat**
- **Prof. Dr. Ahmed El Shemy**
- **Prof. Dr. Sobhy Abdelshafy**
- **Prof. Dr. Hussien Abouelhag**
- **Prof. Dr. Ahmed Allam**
- **Prof. Dr. Hatem Shalaby**
- **Dr. Ahmed Sosa**

Acknowledgements to Conference Partners

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Scientific Program

Opening Day — Hilton Heliopolis, Cairo

DAY 1 • SUNDAY, 27 SEPTEMBER

OPENING & SPECIAL EVENTS

9:30-10 :00 AM — **Registration, Welcome Drink**
Arrival, Registration And Informal Welcome

10:00-11:00 AM — **Opening Ceremony**
Official Opening of ICOVRI 10

11:00-11:30 AM — **Welcome Address & Conference Introduction**
Conference Chairman / Organizing Committee

11:30 AM-12:00 PM — **Honoring and Recognition Ceremony**
Recognition of Distinguished Contributors And Guests

SPECIAL SESSION| 12:00 AM-1:00PM

Rabies Elimination Through Collabora Rabies Elimination Through Collaboration and Innovation Workshop" From Global Expertise to Local Impact, aligned with the Egypt Free of Rabies 2030 Vision

Session Chairman: Dr. Amr Kandil (Deputy Minister of Health and Population for Preventive Medicine, Public Health, and Primary Health Care)

12:00-12:15 PM • **Dr. Amr Kandil** Egypt Free of Rabies 2030 Vision

12:15-12:30 PM • **Dr. Nima Saeed Abid,** WHO Regional Representative in Egypt, **Zero Human Deaths from Dog-Mediated Rabies through the Implementation of the One Health Approach.**

12:30-12:50 PM • **Prof. Dr. Muhammad Munir** Department of Biomedical and Life Sciences, Lancaster University, Lancaster, **Rabies Vaccine for Immunisation and Sterilization**

12:50- 1:00 PM — **Discussion**

1:00:1:20 PM — **KEYNOTE • Prof. Dr. Alaa Eldin Eissa** (Aquatic Veterinary Consultant, Dept. of Aquatic Animal Medicine, Faculty of Veterinary Medicine, Cairo University, Egypt)
Early Mortality Syndrome (EMS): An Evolving Global Threat to Shrimp Farming

1:20- 1:30 PM — **Discussion**

1:30- 2:30 PM — **Lunch break, Poster Session Electronic**

2:30- 2:50 PM — **KEYNOTE • Prof. Dr. Mohamed Ahmed Elmetwally** (Faculty of Veterinary Medicine, Mansoura University & Hannover University of Veterinary Medicine-Germany) **Embryo Transfer in Mares vs. Camels: What makes them different?**

2:50- 3:00 PM — **Discussion**

3:00- 4:00 PM — **Best Applied Research Prize — Announcement of Winners**
Five winners • Certificates / Shields /Recognition

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DAY 2 • MONDAY, 28 SEPTEMBER

Scientific Program

Program begins in the early afternoon to allow travel and arrival.

Tulip Sidi Gaber Hotel, Alexandria | Poultry Health, Vaccines & Emerging Infections

KEYNOTE SPEAKERS

Session Chairs:

Prof . Dr. Hatem Salah Eldin
Prof . Dr. Khaled El -Bayomi
Prof . Dr. Awad Abdel Hafez

1:30-2:00 PM	**Registration**
2:00-2:30 PM	**KEYNOTE • Prof. Dr. El-Sayed M. Abdelwhab,** Head of Laboratory of Avian Influenza, Institute of Molecular Virology and Cell Biology (IMVZ), FLI, Germany **Avian Influenza: Evolutionary Dynamics and Immune Defense**
2:30-2:40 PM	**Discussion**
2:40-3:10 PM	**KEYNOTE• Prof. Dr. Magdy Elkady,** Poultry Diseases · Head of EVPA · Former Dean, Faculty of Veterinary Medicine, Beni Suef University, Egypt **Immunosuppression in Poultry Flocks: A Complicated Situation of Multiple Challenges**
3:10-3:20 PM	**Discussion**
3:20-4:20 PM	**Lunch Break**
4:20-5:00 PM	**KEYNOTE • Prof. Dr. Mounir Iqbal,** Head of the Avian Influenza and Newcastle Disease Group, The Pirbright Institute & Visiting Professor, Royal Veterinary College, London **Avian Influenza: Challenges and Advances in Vaccines**
5:00-5:10 PM	**Discussion**
7:00-10:00 PM	**Dinner**

DAY 3 • TUESDAY, 29 SEPTEMBER Scientific Program

Tulip Sidi Gaber Hotel, Alexandria

10:00–7:00AM | Breakfast

Session Chairs

Prof . Dr. Hossam Hassan, Prof . Dr. Hesham El Khadrawy, Prof . Dr. Ayman Amin

Session 1 | Avian Vaccines & Emerging Viral Diseases

10:00-10:30 AM | **KEYNOTE • Prof. Dr. Hesham Sultan,**
Professor of Bird and Rabbit Diseases and Former Dean of Fac. Of Vet. Med. Sadat City University- Egypt
Current Situation of HPAIV-H5Nx in Egypt During 2025–2026

10:30-10:40 AM | **Discussion**

10:40-11:10 AM | **KEYNOTE • Prof. Dr. Ahmed Elbestawy,**
Vice Dean, Faculty of Veterinary Medicine, Menoufia University, Egypt
Hatchery Vaccination: Building The Immune Foundation in Broilers

11:10-11:20 AM | **Discussion**

11:20-11:50 AM | **KEYNOTE • Prof. Dr. Muhammad Munir,**
Department of Biomedical and Life Sciences, Lancaster University, Lancaster , United Kingdom
Newcastle Disease Virus Across Century

11:50-12:00 PM | **Discussion**

Session Chairs

Prof . Dr. Magdy Elkady, Prof . Dr. Mounir Iqbal, Prof . Dr. Abdel Mohsen Hammam

Session 2 | Nutrition & Immune Foundations

12:00-12:30 PM | **KEYNOTE • Prof. Dr. Nasser Khedr,**
Nutrition & Clinical Nutrition Consultant, Egypt & Middle East · Expert in Poultry, Ruminant, Dairy, Beef, Sheep, Goat, Camel, Fish & Equine Nutrition
Optimizing Immunity Through Clinical Nutrition

12:30-12:40 PM | **Discussion**

12:40-1:10 PM | **KEYNOTE • Prof. Dr. Ahmed El Shemy,**
- Professor of Pathology & Clinical Pathology, Veterinary Research Institute, National Research Centre, Egypt

Gut Immune Foundation

1:10 – 1:20 PM | **Discussion**

1:20-2:20 PM | **Lunch Break**

7:00PM–onward | **Dinner — Zafeer Restaurant**
Conference delegates, keynote speakers and guests

DAY 4 • WEDNESDAY, 30 SEPTEMBER

Scientific Program

Tulip Sidi Gaber Hotel, Alexandria

10:00–7:00AM | Breakfast

Session Chairs

Prof . Dr. Mona Said, Prof . Dr. Nadia Talaat, Prof . Dr. Ahmed El Shemy

SESSION 1 | One Health, and Zoonoses

10:00-10:30 AM | **KEYNOTE• Prof. Dr. Mohamed Osman,**
CEO, La Vache Consultancy Group · Livestock Director, DINA FARMS Farm Development Consultant, Beyti Co.
Immunity Drives Your Bottom Line

10:30-10:40 AM | Discussion

10:40-11:10 AM | **KEYNOTE • Prof. Dr. Wahid Moussa,**
Department of Parasitology, Faculty of Veterinary Medicine, Cairo University, Egypt
Parasites, Risk Assessment and Zoonotic Importance

11:10-11:20 AM | Discussion

Session Chairs

Prof . Dr. Sobhy Abdelshafy, Prof . Dr. Hussien Abouelhag, Prof . Dr. Ahmed Allam

SESSION 2 | Advanced Vaccines & Innovation

11:20-11:50 AM | **KEYNOTE• Prof. Dr. Adel M. Talaat,**
Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin, Madison, WI, United States
Superior Protection Against Tuberculosis Using Nanoadjuvant RNA Vaccines

11:50 -12:00 PM | Discussion

12:00-12:30 PM | **KEYNOTE • Prof. Dr. Hoda Elkhenany,**
Surgery department, Faculty of Veterinary Medicine, Alexandria University, Egypt.
Immune Modulation for Spinal Cord Regeneration

12:30-12:40 PM | Discussion

12:40-1:00 PM | Diamond Sponsor

1:00-1:20 PM | Diamond Sponsor

1:20-1:40 PM | Diamond Sponsor

1:40-1:50 PM | Platinum Sponsor

1:50-2:20 PM | Honoring of Sponsors and Closing Ceremony
Conference highlights • acknowledgements • closing remarks

2:20-3:20 PM | Lunch Break

7:00 PM - onward

Gala dinner

Group Photo & Farewell

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Poster Presentations

Session Chairs:

Prof . Dr. Hatem Shalaby

Dr. Ahmed Sosa

KEYNOTE SPEAKERS

10TH INTERNATIONAL CONFERENCE

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27 - 30 SEPTEMBER 2026
ALEXANDRIA, EGYPT

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Innovation for One Health

PEOPLE • ANIMALS • ENVIRONMENT

OUR DISTINGUISHED SPEAKERS

SHARING KNOWLEDGE • SHAPING A HEALTHIER TOMORROW

Prof. Dr. Magdy Elkady
Professor of Poultry Diseases. Head of EVPA. Former Dean, Faculty of Veterinary Medicine, Beni Suef University

Prof. Dr. Ahmed Elbestawy
Vice Dean, Faculty of Veterinary Medicine, Menoufia University, Egypt

Prof. Dr. Mohamed Osman
CEO, La Vache Consultancy Group Livestock Director, DINA FARMS. Farm Development Consultant, Beyti Co.

Prof. Dr. Alaa Eldin Eissa
Professor & Aquatic Veterinary Consultant, Dept. of Aquatic Animal Medicine, Faculty of Veterinary Medicine, Cairo University

Prof. Dr. Nasser Khedr
Nutrition & Clinical Nutrition Consultant, Egypt & Middle East
Expert in Poultry, Ruminant, Dairy, Beef, Sheep, Goat, Camel, Fish & Equine Nutrition

Prof. Dr. Mounir Iqbal
Head of the Avian Influenza and Newcastle Disease Group, The Pirbright Institute & Visiting Professor, Royal Veterinary College, London

Prof. Dr. Ahmed El Shemy
Professor of Pathology & Clinical Pathology, Veterinary Research Institute, National Research Centre, Egypt

Prof. Dr. El-Sayed M. Abdelwhab
Head of Laboratory of Avian Influenza, Institute of Molecular Virology and Cell Biology (IMVZ), FLI, Germany

Prof. Dr. Hesham Sultan
Professor of Bird and Rabbit Diseases and Former Dean of Fac. Of Vet. Med. Sadate City Unversity- Egypt

Prof. Dr. Wahid Moussa
Professor of Parasitology, Faculty of Veterinary Medicine, Cairo University, Egypt

Prof. Dr. Muhammad Munir
Department of Biomedical and Life Sciences, Lancaster University, Lancaster LA1 4YW, United Kingdom

Prof. Dr. Adel M. Talaat
Department of Pathobiological Sciences, School of Veterinary Medicine, University of Wisconsin, Madison, WI, United States

Prof. Dr. Hoda Elkhenany
Surgery department, Faculty of Veterinary Medicine, Alexandria University, Egypt.

Prof. Dr. Mohammed Ahmed Elmetwally
Department of Theriogenology | Faculty of Veterinary Medicine, Mansoura University, DVM, Ph.D. | Hannover University of Veterinary Medicine-Germany | Postdocs:Cornell University | USA (Physiology of Reproduction) (Texas A&M University | USA (Uterine Biology and Pregnancy Lab) University of California, Irvine | UCI. Department of Obstetrics & Gynecology, USA

ONE HEALTH

Partnering for Scientific Excellence,
One Health, Better Future

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أ.د. مجدي القاضي

أستاذ أمراض الدواجن

رئيس الجمعية البيطرية المصرية للدواجن

عميد كلية الطب البيطري
جامعة بني سويف الأسبق

محاور الإهتمام

- صحة الدواجن ومقاومة الأمراض
- تحسين الإنتاج وجودة الطيور
- الصحة الواحدة والأمن الغذائي

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Conference Keynote Speaker

أ.د. محمد منير

Prof.Dr.Muhammad Munir

- **Department of Biomedical and Life Sciences, Lancaster University, Lancaster LA1 4YW United Kingdom**

بحث علمى RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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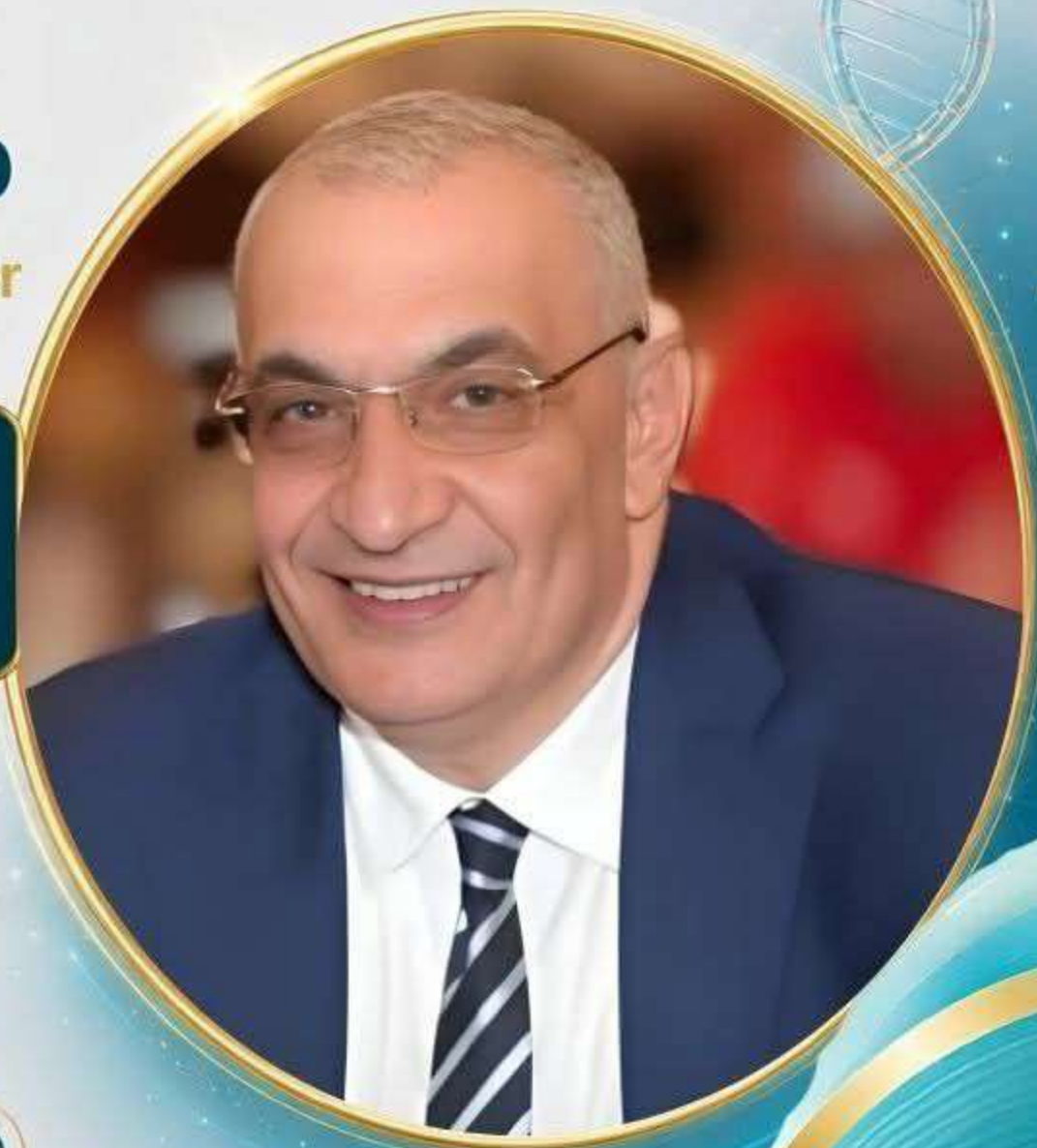
محاضر المؤتمر

Conference Keynote Speaker



أ.د. هشام سلطان

Prof.Dr.Hisham Sultan

- أستاذ أمراض الطيور والأرانب
- عميد سابق لكلية الطب البيطري بجامعة مدينة السادات - مصر

بحث علمى RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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Conference Keynote Speaker

أ.د. منير إقبال

Prof.Dr.Munir Iqbal

- **Head of the Avian Influenza and Newcastle Disease Group, The Pirbright Institute**
- **Visiting Professor, Royal Veterinary College, London**

بحث علمى RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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Conference Keynote Speaker

أ.د. السيد محمد عبد الوهاب

Prof.Dr.El-Sayed M Abdelwhab

Head of Laboratory of Avian Influenza, Institute of Molecular Virology and Cell Biology (IMVZ), FLI, Germany

بحث علمى RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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محاضر المؤتمر

Conference Keynote Speaker

د. محمد عثمان

Dr.Mohamed Osman

- رئيس قطاع الإنتاج الحيواني بمزارع دينا
- استشاري تطوير المزارع بشركه بيتي إحدي شركات المراعي
- الرئيس التنفيذي لشركة لافاش جروب

جودة عالمية GLOBAL QUALITY | ابتكار INNOVATION | فعالية EFFICACY | حماية PROTECTION | بحث علمى RESEARCH

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محاضر المؤتمر

Conference Keynote Speaker

أ.د. ناصر خضر

Prof.Dr.Nasser Khedr

- استشاري تغذية وتغذية سريرية، مصر والشرق الأوسط · خبير في تغذية الدواجن، المجترات، منتجات الألبان، الأبقار، الأغنام، الماعز، الإبل، الأسماك والخيول

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Conference Keynote Speaker

أ.د. علاء الدين عيسى

Prof.Dr.Alaa Eldin Eissa

- استاذ طب الاحياء المائية كلية الطب البيطرى جامعة القاهرة
- استشارى الطب الوقائى والأمن الحيوي للمزارع السمكية

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Conference Keynote Speaker

أ.د. أحمد البستاوي

Prof. Dr. Ahmed Elbestawy

وكيل كلية الطب البيطري
جامعة المنوفية - مصر

Vice Dean, Faculty of Veterinary Medicine,
Menoufia University, Egypt

بحث علمي RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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محاضر المؤتمر

Conference Keynote Speaker

أ.د. عادل طلعت

Prof.Dr.Adel Talaat

- قسم العلوم المرضية البيولوجية، كلية الطب البيطري، جامعة ويسكونسن، ماديسون، ويسكونسن، الولايات المتحدة الأمريكية

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محاضر المؤتمر

Conference Keynote Speaker

أ.د. هدى الخناني

Prof.Dr.Hoda Elkhenany

- قسم الجراحة، كلية الطب البيطري، جامعة الإسكندرية، مصر.

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محاضر المؤتمر

Conference Keynote Speaker

أ.د. محمد المتولي

Prof.Dr.Mohammed Ahmed

- دكتور في الطب البيطري، دكتوراه قسم التناسل الحيواني كلية الطب البيطري، جامعة المنصورة
- دكتور في الطب البيطري، جامعة هانوفر للطب البيطري - ألمانيا
- المستشار العلمي لمركز الملك عبدالعزيز للخيل العربيه الأصيله: المملكه العربيه السعوديه

جودة عالمية GLOBAL QUALITY | ابتكار INNOVATION | فعالية EFFICACY | حماية PROTECTION | بحث علمى RESEARCH

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27 - 30 SEPTEMBER 2026

محاضر المؤتمر

Conference Keynote Speaker

أ.د. وحيد موسى

Prof.Dr.Wahid Moussa

أستاذ علم الطفيليات، كلية الطب البيطري، جامعة القاهرة، مصر

جودة عالمية GLOBAL QUALITY | ابتكار INNOVATION | فعالية EFFICACY | حماية PROTECTION | بحث علمى RESEARCH

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استاذ الباثولوجيا و الباثولوجيا الاكلينيكية
معهد البحوث البيطريه
المركز القومي للبحوث

بحث علمى RESEARCH | حماية PROTECTION | فعالية EFFICACY | ابتكار INNOVATION | جودة عالمية GLOBAL QUALITY

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Book of Abstracts

Animal Reproduction & AI

NOTCH4 gene polymorphism and its association with cow fertility and milk traits

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Notch signaling is an emerging pathway in reproductive biology; however, its role in female fertility and production traits in cattle remains poorly understood. This study aimed to characterize polymorphisms within the *NOTCH4* gene and investigate their associations with postpartum ovarian anestrus, reproductive performance, and milk production traits in cattle. A total of 305 cows were classified into three groups according to their reproductive status: cyclic cows, cows with postpartum anestrus lasting 6–12 months (PPA 6–12), and cows with prolonged postpartum anestrus lasting >12 months (PPA >12). Age at first calving (AFC), calving interval (CI), calf birth weight (CBW), days of milking (DM), and milk yield (MY) were recorded. Genomic DNA was extracted from blood samples, and PCR–single-strand conformation polymorphism (PCR-SSCP) analysis was performed for three *NOTCH4* regions, including exon 18, exon 23, and intron 6–exon 7. Representative SSCP patterns were subsequently characterized by DNA sequencing. Exon 18 showed a monomorphic pattern, whereas exon 23 and intron 6–exon 7 exhibited substantial genetic variation. Six genotypes (GG, AA, AG, GA, CA, and CC) and three single-nucleotide polymorphisms (SNPs) were identified in exon 23. These included one C>A transversion at position 23:27192120 (rs209413136) and two G>A/A>G transitions at positions 23:27191987 (rs440643062) and 23:27192056 (rs135428127), respectively. In intron 6–exon 7, eight genotypes (AA, GG, AG, WK, WW, KK, BB, and QB) and four transition SNPs were identified at positions 23:27176096, 23:27176145, 23:27176249, and 23:27176260, corresponding to rs436048379, rs3423513062, rs721104930, and rs3423493402, respectively. Cows with PPA>12 month exhibited a longer CI, earlier AFC, lower CBW, higher MY, and prolonged days in milk compared with the other reproductive groups. Genotype-specific associations were also observed. In exon 23, the CC genotype was associated with the highest CBW and the shortest CI and AFC, whereas the CA genotype was associated with the highest MY and longest DM. Within intron 6–exon 7, the KK genotype was associated with the shortest CI and AFC and the highest CBW, while the WW genotype was associated with the longest DM and the AA genotype with the highest MY.In conclusion, the *NOTCH 4* may be used as genetic marker for fertility and milk production traits in post-partum anestrum cows more than 12 months.

Keywords: *NOTCH4*; postpartum anestrus; cattle; polymorphism; PCR-SSCP; SNP; milk yield; reproductive performance.

Accuracy of Transrectal Palpation for Diagnosis of Some Infertility Problems in Buffalo

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Reproductive inefficiency of buffalo remains a major constraint to herd productivity. Ovarian and oviductal abnormalities are known to be one of the important causes of infertility. Transrectal palpation is most practical, simple and economical in field condition but the accuracy of diagnosis for minimal abnormalities remains doubtful The purpose of this study was to determine the accuracy of single transrectal palpation for diagnosing ovarian and oviductal pathologies in buffalo using post slaughter gross and histopathological examination as a reference standard. The genitalia of 212 buffalo were examined by single transrectal palpation prior slaughter and validation with postmortem as reference test was conducted. The postmortem examination confirmed that 23.6% of the studied cases had ovarian and oviductal abnormalities where inactive ovaries, ovariobursal adhesions, ovarian cysts and salpingitis were found to be the most common lesions. The diagnostic performance analysis revealed low sensitivity (20.0%), while specificity was comparatively high (80.2%). The diagnostic test accuracy rate was 66.0%. The poor sensitivity reflected frequent underdiagnosis, particularly of small follicles and oviductal lesions, while higher specificity indicated better reliability in identifying normal structures. These results highlighted the limitations of rectal palpation as a sole diagnostic tool for infertility problems in buffaloes and emphasize the need for complementary methods to improve reproductive management and reduce economic losses.

Keywords: buffalo, infertility, accuracy, rectal palpation, ovarian abnormalities, salpingitis.

Veterinary Parasitology

Mosquitocidal properties and bioactive efficacy of *Hyssopus officinalis* and *Chrysanthemum cinerariifolium* against *Culex pipiens* larvae (Diptera: Culicidae)

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The mosquitocidal efficacy of 70% ethanol extract derived from the air-dried herbs of *Hyssopus officinalis* and *Chrysanthemum cinerariifolium*, both cultivated in Egypt, was evaluated against the 3rd and 4th instar larvae of *Culex pipiens.* Separate preparations of the extracts were analyzed for their total phenolics, flavonoids content, as well as antioxidant activity. Both extracts, Pyrethrum and Hyssop, demonstrated a substantial total phenolics content. Pyrethrum surpassed Hyssop in terms of flavonoids content. The antioxidant activity exhibited by both extracts was promising, showing a proportional increase with the concentration, and achieving a peak at 125 µg/ml. The mosquitocidal effect of the extracts also displayed a concentration-dependent increase, achieving maximum larval mortality at 10,000 ppm for the 4th instar larvae after 48 h. The LC_{50} values indicated a more pronounced effect on the 4th instar, with 2810 for Hyssop and 31129.9 ppm for Pyrethrum. The histological examinations of treated larvae revealed significant abnormalities, including a disorganized cuticle lacking differentiation into epicuticle and endocuticle layers. These findings suggest the potential of these plant extracts as bioactive agents for mosquito control, thereby contributing to the field of eco-friendly pest management.

Keywords: *Hyssopus officinalis*, *Chrysanthemum cinerariifolium*, *Culex pipiens*, Mosquitocidal efficacy, Eco-friendly pest management.

Vaccine & Infectious Diseases

Evaluation of the Protective Immune Response Elicited by an Inactivated Rift Valley Fever Vaccine with a Novel Immunostimulatory Agent in Sheep

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The present study was conducted to evaluate the immunostimulatory effects of a pathogen-associated molecular pattern (PAMP)-based preparation, inactivated rabies vaccine, and Bacillus Calmette–Guérin (BCG) vaccine on the humoral immune response induced by the inactivated RVF vaccine in sheep. Twenty-five native sheep (1–2 years old) were randomly allocated into five groups (n=5). Group A received PAMPs two days before vaccination, Group B received inactivated rabies vaccine simultaneously with the RVF vaccine, Group C received BCG simultaneously with the RVF vaccine, Group D received the RVF vaccine alone, while Group E served as an unvaccinated control. Serum samples were collected before vaccination and periodically for six months, and RVF virus-neutralizing antibodies were determined using the serum neutralization test (SNT). The result revealed that, Sheep immunized with BCG showed the highest and most sustained antibody response, reaching a mean neutralizing antibody titer of 640 at the third month post-vaccination and maintaining high titers (520) until the sixth month. The PAMP-treated group showed the second highest response with peak mean titers of 544 during the third and fourth months, whereas the rabies vaccine group exhibited an intermediate response with peak titers of 384. Sheep vaccinated with the RVF vaccine alone developed significantly lower antibody titers, which declined rapidly after the third month. The results demonstrate that immunostimulants, particularly BCG and (PAMP)-based preparation markedly enhance both the magnitude and duration of the humoral immune response induced by the inactivated RVF vaccine in sheep and may improve the efficacy of RVF vaccination programs.

Key words: RFV vaccine, sheep, BCG, PAMPs, Rabies vaccine, SNT

Evaluation of the efficacy of sheep passive immunization against pest des petits ruminant's virus infection to be applied in emergency cases

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Pest des petits ruminants (PPR) is a fierce viral disease affects sheep and goat population dramatically causing great economic losses. Disease control depends mainly on proper vaccination with specific potent vaccine. Emergency; passive immunization of susceptible animals may be in need. This study aims to determine the possibility of sheep protection against the virus infection simulating an outbreak through their immunization with specific anti-PPR hyper immune serum and inactivated PPR singly or in a simultaneous manner. The study included different groups of susceptible sheep. One group was inoculated with the hyperimmune serum alone; other group received hyperimmune serum with single dose inactivated vaccine. Two groups received one and 2 doses of inactivated vaccine leaving a group without any inoculation as test control. The levels of induced immunity in all animals were followed up through application of serum neutralization test (SNT) on different periods post inoculation. It was found that passive immunization with specific anti-PPR hyper immune serum alone can provide sheep with protective level of immunity up to 3 weeks while such immunity could be prolonged to several months when administrated with the inactivated vaccine. Tow doses of the inactivated oil adjuvanted PPR vaccine has the capability to induce good immunity for vaccinated sheep able to withstand virus infection. The best preferable passive immunization of sheep against PPR virus infection is the administration of specific antiserum simultaneously with single dose of the inactivated vaccine. Double dose of inactivated PPR vaccine are sufficient to protect sheep against virus infection.

Key words: Pest des petits ruminants; hyper immune serum; passive immunization; inactivated PPR vaccine; serum neutralization

The Interplay of Climate Change, Environmental Factors and Emerging, Re-emerging Viral Diseases: (Mechanisms, Projections, and Public Health Imperatives)

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This review aims to provide a comprehensive understanding of the interconnected dynamics between climate change, environmental factors, and viral diseases to inform the development of effective, integrated public health strategies.Employing an interdisciplinary qualitative synthesis method, existing literature and case studies from WHO, IPCC, and epidemiological reports were systematically gathered and analyzed to establish a causal framework.Findings demonstrate that climate-driven vector expansion, habitat alteration, and environmental dynamics significantly accelerate zoonotic spillover and disease transmission, disproportionately burdening vulnerable populations.Ultimately, transitioning to a proactive "One Health" framework—integrating advanced surveillance, resilient infrastructure, and global collaboration—is essential to mitigate future pandemic risks.

Keywords: Climate change, Emerging viral diseases, One Health, Zoonotic spillover, Disease surveillance

Superior Protection Against Tuberculosis Using Nanoadjuvant RNA Vaccines.

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Tuberculosis (TB) remains a major global health threat, underscoring the need for vaccines that surpass BCG efficacy. The main purpose of the presented work is to develop a platform technology that can help in the control of TB in both animal and human populations. Recently, we developed QTAP-R, a novel mRNA–lipid nanoparticle (LNP) vaccine encoding Ag85B, Hsp70, and ESAT-6, to enhance immunity against Mycobacterium tuberculosis, the causative agent of TB. QTAP efficiently encapsulated and delivered mRNA with high transfection efficiency and low cytotoxicity compared to other adjuvants. In C57BL/6 mice, QTAP-R induced strong antigen-specific IgG and T-cell responses, including elevated $CD4^+$ and $CD8^+$ activation and increased polyfunctional cytokines (IFN-γ, TNF-α, IL-2, IL-17A). When combined with BCG (BCG+QTAP-R), the vaccine elicited enhanced immune memory, reduced bacterial burden in lungs and spleen, and minimized lung pathology following M. tuberculosis challenge. Subcutaneous QTAP-R (QTAP-SQ) provided partial protection under high-dose challenge, outperforming intranasal delivery. Transcriptomic profiling revealed upregulation of inflammatory cytokines and chemokines, indicating enhanced immune recruitment and activation. $CD4^+$ T-cell depletion abolished protection, confirming their critical role in QTAP-R mediated immunity. Overall, QTAP-R demonstrates potent immunogenicity and synergistic efficacy with BCG, positioning it as a promising mRNA-based TB vaccine candidate. A similar immunization strategy based on the “One Health” concept, could be implemented to control TB in both animals and humans. Keywords. Tuberculosis, mRNA vaccine, Nanoadjuvant, Lipid Nanoparticle, Immunogenicity, Protective efficacy.

Evaluation of MDBK cells susceptibility for Rift Valley Fever virus propagation

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Rift Valley Fever (RVF) is a high-risk zoonotic disease with a special epidemiological profile that constitutes a major challenge which requires strengthen disease control measures that relies primarily on vaccination. Inclusion of multiple cell lines strategy as vaccine production platform provides a safeguard against production interruption to ensure continuous vaccine availability and to enhance outbreak response strategy. The present study aimed to evaluate the susceptibility of MDBK cells line as an alternative cell line for propagation of RVFV in comparison to the routinely used Vero and BHK cell lines. RVFV was serially propagated in MDBK cells for five successive passages with quantification of viral yield by infectivity titration at each passage. The antigenic integrity of the harvested virus was confirmed using VNT. Expression of RVFV-specific antigen in infected MDBK cells was demonstrated using FAT, while, molecular identity was confirmed by conventional RT-PCR. Furthermore, growth curve study was conducted to track replication over 72 hours post inoculation. These findings illustrated that MDBK cells derived RVFV achieved a satisfactory infectivity titer ($10^{8.2}$ $TCID_{50}$/ml) while preserving its biological and antigenic characteristics as well as molecular identity without detectable alteration validating MDBK cells as suitable alternative cell line for RVFV propagation and vaccine production.

Key words: RVFV, MDBK cells**,** alternative cell line, cell line susceptibility, growth kinetics

Screening of Sucrose- and Lactose-Based Stabilizers at Different pH Values for the Stability of Live Newcastle Disease Virus Lasota Vaccine

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This single-run exploratory pilot study evaluated sucrose- and lactose-based stabilizers at pH 6.0, 7.0, and 8.0 for their ability to preserve the infectivity of live Newcastle disease virus (NDV) LaSota vaccine during storage. Vaccine infectivity was assessed by Egg Infective Dose 50 (EID_{50}) assay following refrigerated, bench/room-temperature, and elevated-temperature storage for up to 3 months, while cake appearance was evaluated as a complementary physical attribute. Among the formulations tested, sucrose at pH 6.0 showed the most favorable stability profile, retaining 9.2 $\log_{10}$ EID_{50}/mL from post-lyophilization through 3 months of refrigerated storage, with no apparent loss relative to the post-lyophilization baseline. It was also the only formulation to retain measurable infectivity after 3 months of bench/room-temperature storage and maintain an intact cake throughout the observation period. In contrast, formulations at pH 7.0 and 8.0 exhibited greater numerical losses in infectivity and more frequent cake collapse, particularly under elevated-temperature conditions. These findings support sucrose at pH 6.0 as a lead formulation for further development and provide a practical basis for prioritizing confirmatory stability studies.

Keywords: Newcastle disease virus; LaSota; live vaccine; sucrose; lactose; lyophilization; vaccine formulation; stability screening.

Heterologous Neutralization Profiles Among Avian Reovirus Genotype Clusters Reveal Absence of Cross-Reactivity

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The extensive genetic and antigenic diversity of avian reovirus (ARV) limits effective vaccine protection. Here, we evaluated heterologous cross-neutralization among predominant ARV genotypic clusters (GCs) circulating in Egypt. Seventy-two specific pathogen-free (SPF) chickens were randomly allocated into four equal groups (n = 18/group). Groups 1, 2, and 3 received inactivated monovalent vaccines (S1133 “GC1”, GC4, and GC5, respectively) at 2 and 6 weeks of age, while group 4 served as an unvaccinated control. Sera collected at 1 day of age, before vaccination, and 4 weeks post-booster were evaluated via an enzyme-linked immunosorbent assay (ELISA) and serum neutralization test (SNT) against homologous and heterologous ARV strains (S1133, variant GC1, GC2, GC4, and GC5). All vaccinated groups developed significant humoral responses, achieving post-booster ELISA geometric mean titers of 3130, 3732, and 2899 for S1133, GC4, and GC5, respectively. Homologous SNT titers ranged from 7 to 11 $\log_2$ (cut-off: 6 log 2), confirming strong neutralizing activity against vaccine-matched strains. In contrast, no cross-neutralization was detected against heterologous strains, even between the classical GC1 (S1133) and variant GC1 strains within the same genogroup. These findings demonstrate a lack of cross-neutralization among different ARV genogroups. To our knowledge, this is the first study to demonstrate limited serological cross-neutralization among genetically distinct ARV genotypes using the field isolates circulating in Egypt. Consequently, these findings emphasize the necessity of continuous molecular surveillance and regular updates to commercial ARV vaccine compositions to incorporate emerging antigenically distinct variants.

Key Words: Avian reovirus; inactivated vaccine; cross-neutralization; genogroup clusters; ELISA; serum neutralization test.

Food Hygiene

Ozone as a Dual-Function Agent: Healing, Regeneration, and Meat Preservation

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Ozone (O_3) has emerged as a multifunctional agent with significant potential in both veterinary medicine and meat science due to its strong oxidative properties and broad-spectrum biological activity. This review provides a comprehensive overview of the dual role of ozone, focusing on its therapeutic applications in tissue healing and repair, as well as its effectiveness in improving meat quality and safety. In veterinary contexts, ozone exerts its beneficial effects through the induction of controlled oxidative stress, which activates key molecular pathways, including nuclear factor erythroid 2–related factor 2 (Nrf2), nuclear factor kappa B (NF-κB), and vascular endothelial growth factor (VEGF). These pathways collectively contribute to enhanced antioxidant defense, angiogenesis, and stimulation of fibroblast activity, ultimately accelerating tissue regeneration and wound healing. Concurrently, in meat and meat products, ozone functions as a potent antimicrobial agent capable of inactivating a wide range of foodborne pathogens through oxidative disruption of cellular structures and metabolic processes. The efficacy and safety of ozone are therefore highly dependent on factors such as concentration, exposure time, delivery method, and the characteristics of the biological or food matrix. Despite its promising applications, limitations, including dose-dependent toxicity, lack of standardized protocols, and incomplete understanding of its molecular mechanisms, remain significant challenges. Future perspectives highlight the importance of developing advanced delivery systems, and establishing evidence-based guidelines to optimize its use. In conclusion, ozone represents a dynamic and promising tool that, when precisely applied, can contribute to improved animal health and enhanced quality of meat products.

Keywords: Ozone, veterinary medicine, wound healing, meat quality, oxidative stress.

A sustainable green strategy for disinfecting milking goat udder using electro-chemically activated water compared to iodine and its impact on milk safety and quality

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Microorganisms in milk originated from environmental, mammary infection and udder flora sources. Accordingly, this study evaluated the effectiveness of different udder sanitation treatments in improving udder hygiene and reducing microbial contamination of raw milk. The external udder surface and teats were treated using normal saline, iodine, and sequential slightly alkaline electrolyzed water followed by slightly acidic electrolyzed water (SAlEW–SAcEW) for three consecutive experimental days by determining APC, *S. aureus*, and mold and yeast counts, *E. coli* counts in addition to isolation and identification *Salmonella enterica* and *L. monocytogenes* on the external udder surface and teats and in the corresponding milk samples and APC of milk containers. Significant differences were observed among treatments. Normal saline showed the lowest antimicrobial effectiveness in which APC on the external udder surface remained high, decreasing only from 10.92 to 9.66 $\log_{10}$ CFU/cm², while mold and yeast counts decreased from 3.64 to 3.20 $\log_{10}$ CFU/cm² during the experimental period. Iodine produced greater reductions, with APC on the udder surface decreasing from 5.87 to 4.05 $\log_{10}$ CFU/cm², with some variation during the experimental period, whereas *S. aureus* counts declined from 1.36 to 1.02 $\log_{10}$ CFU/cm² and mold & yeast counts from 3.06 to 1.01 $\log_{10}$ CFU/cm². *E. coli* recorded < 1$\log_{10}$ CFU/cm², while *Salmonella enterica* and *L. monocytogenes* could not be detected in examined treated samples. In contrast, sequential SAlEW–SAcEW exhibited the greatest antimicrobial activity, reducing total bacterial counts on the udder surface from 4.00 to 2.00 $\log_{10}$ CFU/cm², while *S. aureus* declined from 0.64 $\log_{10}$ CFU/cm² to non-detectable levels, and mold and yeast counts decreased from 2.34 to non-detectable levels at the 3rd day. Similar reductions were observed in the corresponding milk samples, where sequential SAlEW–SAcEW reduced total bacterial counts from 3.52 to 1.50 $\log_{10}$ CFU/mL. The superior activity of sequential EW may be attributed to the complementary action of SAlEW in removing organic matter and adherent contaminants, followed by the strong antimicrobial activity of SAcEW. Overall, treatment effectiveness followed the order sequential SAlEW–SAcEW > iodine > normal saline, supporting sequential EW which act as an active germicidal, udder skin moisturizers, no residues in milk and not harmful for animal & milker-man. Also, as a promising environmentally friendly strategy for improving udder hygiene and enhancing the microbiological quality and safety of raw milk.

Keywords: Slightly alkaline electrolyzed water (SAlEW); Slightly acidic electrolyzed water (SAcEW); Raw milk; Microbial quality; *S. aureus*; Aerobic plate count (APC); Dairy hygiene; Food safety.

Phenotypic characterization of coliform bacteria isolated from meat and meat products

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This study aimed to isolate and characterize coliform bacteria from meat and meat products, determine their antimicrobial susceptibility profiles, identify multidrug-resistant (MDR) and extensively drug-resistant (XDR) isolates, and assess their biofilm-forming ability. A total of 125 samples of meat and meat products were collected from different places in Menoufia Governorate and examined for coliform bacteria. Suspected isolates were identified by biochemical tests, and antimicrobial susceptibility was determined against selected antimicrobial agents. MDR and XDR isolates were identified according to their resistance profiles. Presumptive pathogenic *Escherichia coli* isolates were screened using Congo red agar. Selected MDR isolates were assessed for biofilm formation using a 96-well microtiter plate method with biofilm quantified using an ELISA microplate reader. The isolates included 40 *E. coli*, 17 *Klebsiella oxytoca*, 19 *Klebsiella pneumoniae*, 6 *Enterobacter spp*., and 4 *Citrobacter spp*. Frequent resistance was observed to ampicillin, amoxicillin-clavulanate, and cefotaxime, whereas imipenem showed comparatively high activity. 16 isolates were classified as MDR or XDR, comprising 11 E. coli, two *K. pneumoniae*, one *K. oxytoca*, one *Enterobacter spp*., and one *Citrobacter spp*. Of the 16 isolates examined for biofilm formation, five (31.3%) were biofilm producers. Three E. coli isolates showed biofilm formation, while one K. pneumoniae and one Citrobacter isolate showed moderate biofilm formation. The recovery of MDR/XDR coliforms and biofilm-producing coliforms indicates the occurrence of antimicrobial-resistant and biofilm-forming bacteria, highlighting the importance of continued antimicrobial-resistance surveillance and hygienic control measures in the meat-production chain.

Keywords: Coliforms, Escherichia coli, antimicrobial resistance, MDR, XDR, biofilm.

Combating of polymicrobial foodborne pathogens biofilms using carvone and gallic acid nanoemulsions

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Foodborne pathogens capable of forming polymicrobial biofilms represent a major challenge to food safety, as interactions between different bacterial species can enhance biofilm persistence, resistance to antimicrobial interventions, and cross-contamination of food-contact surfaces. This study investigated the potential of nanoemulsions containing carvone and gallic acid as innovative natural-based strategies for controlling polymicrobial biofilms formed by major foodborne pathogens, including *Staphylococcus aureus, Escherichia coli, Salmonella Typhimurium*, and *Pseudomonas aeruginosa*. Carvone and gallic acid were formulated into nanoemulsions to improve their dispersion, stability, and antimicrobial performance. The developed nanoemulsions were characterized for their physicochemical properties and evaluated against planktonic bacterial cells and established polymicrobial biofilms. Their effects on biofilm formation and mature biofilms were assessed, together with changes in key biofilm-associated characteristics, including extracellular polymeric substance (EPS) production and quorum-sensing-related behavior. The results demonstrated enhanced antimicrobial and antibiofilm activity of the nanoformulated compounds compared with their non-nanoformulated counterparts. The nanoemulsions effectively inhibited biofilm development and disrupted established polymicrobial biofilms, with reductions associated with interference in EPS production and bacterial communication mechanisms. The combined use of carvone and gallic acid showed promising synergistic or complementary effects against the tested foodborne pathogens. Overall, carvone–gallic acid nanoemulsions represent a promising natural, multifunctional antibiofilm strategy for controlling complex polymicrobial biofilms. Their ability to simultaneously target bacterial viability, biofilm matrix formation, and quorum-sensing-associated processes highlights their potential application in food preservation and sanitation of food-processing environments.

Nanoformulated Pomegranate Extract-Loaded Carboxymethyl Cellulose Film as an Active Packaging System for Meat Preservation

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The development of sustainable and intelligent food-packaging systems is increasingly important for improving the safety and shelf-life of highly perishable meat products. This study aimed to develop a biodegradable pH-responsive active packaging film based on carboxymethyl cellulose (CMC) incorporating nanoformulated pomegranate extract as a natural source of antimicrobial and antioxidant compounds. A flavonoid-rich pomegranate extract was nanoformulated using a chitosan–sodium alginate system to improve the stability, dispersibility, and controlled release of its bioactive compounds. The developed pomegranate nanoparticles (Pg-NPs) were characterized by Fourier-transform infrared spectroscopy (FTIR), particle-size analysis, zeta-potential measurement, and transmission electron microscopy (TEM). The Pg-NPs were subsequently incorporated into CMC films to produce a nano-enabled active packaging material. The films were evaluated for their structural, morphological, thermal, mechanical, surface, barrier, and antimicrobial properties. Their effectiveness was further investigated for preserving beef and poultry meat under refrigerated storage. The developed Pg-NPs showed a mean particle size of approximately 232 nm and a zeta potential of −20.7 mV**.** Incorporation of the nanoformulated extract enhanced the functional properties of the CMC film, particularly its antimicrobial activity. The nano-enabled films effectively inhibited bacterial growth and extended the refrigerated shelf-life of both beef and poultry meat to 12 days **c**ompared with Pg-NP-free CMC films. Importantly, the incorporation of nanoformulated pomegranate bioactives provides a controlled and potentially pH-responsive release mechanism**,** allowing the active compounds to be delivered according to changes in the food microenvironment during storage. This research presents an innovative nano-enabled, pH-responsive active packaging platform that integrates biodegradable CMC, natural pomegranate bioactives, and controlled release technology. The system combines nanotechnology, smart packaging, and natural food preservation to improve meat safety and shelf-life while reducing dependence on conventional preservatives. The developed approach has potential for practical application in sustainable meat packaging and may contribute to safer food systems and reduced food waste.

Keywords: Pomegranate extract; Nanoformulation; pH-responsive packaging; Controlled release; Carboxymethyl cellulose; Active packaging; Meat safety; Food preservation.

Quantitative Determination of D-3-Hydroxybutyric Acid in some Egg-Based Products in the Egyptian Market.

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Abstract

D-3-Hydroxybutyric acid (3-HBA) is a vital biochemical marker for detecting the substitution of fresh eggs with low-quality, fertilized, or incubated eggs in food production, which raises serious concerns about food authenticity and quality. This study aimed to determine the concentration of (3-hydroxybutyric acid, 3-HBA) in a variety of commercially available egg-based products—including whole shell eggs, cakes, and mayonnaise—collected from the Egyptian market. The analysis was conducted using a UV-Vis spectrophotometric enzymatic assay (K-HDBA kit, Megazyme) to quantify 3-HBA levels and to evaluate whether the tested samples comply with the Egyptian Standard Specifications for egg freshness and quality. Results revealed significant variation in 3-HBA levels among the product categories. Most shell eggs and cake samples were compliant. However, two mayonnaise samples were found to be critically non-compliant, with concentrations far exceeding the Egyptian regulatory limit of 10 mg/kg (ES 5873/2023), reaching a high of 44.625 mg/kg. which strongly suggests non-compliance based on the official dry matter standard. These findings represent the first comprehensive 3-HBA dataset for Egyptian egg products, highlighting potential lapses in industry quality control and underscoring the critical need for routine biochemical screening and stricter regulatory enforcement to ensure compliance with national food safety standards.

Assessment of commercial smoked fish quality and experimental evaluation of different smoking techniques on microbiological, physicochemical, and sensory quality of Atlantic herring (*Clupea harengus*) and salmon (*Salmo salar*)

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This study evaluated the safety status of commercial smoked fish in local Egyptian markets and compared traditional (hot and cold) with novel thermal-barrier smoking methods (thermal bag, oven, and liquid smoking) for their effects on the microbiological, physicochemical, and sensory quality of salmon and herring. A market survey of 100 commercial samples (85 herring, 15 salmon) was conducted to assess parasite prevalence by light and electron microscopy, microbial quality, and deterioration attributes. Experimentally, raw salmon and herring fish were subjected to five smoking techniques. We evaluated parameters including microbial populations (APC, Staphylococcus aureus, coliforms, anaerobes, yeast/mold), deterioration indicators (pH, TVB-N, TMA, TBARS, histamine), and sensory attributes. The market survey revealed higher microbial loads and lower quality deterioration indices than smoked salmon. As well, 30.59% of commercial herring samples were infested with live *Anisakis simplex* larvae, whereas all salmon samples were parasite-free. In experimental trials, all thermal-barrier processing methods provided significant antimicrobial effects compared to raw controls. Thermal bag smoking demonstrated the highest bactericidal efficacy, achieving maximum reductions in aerobic plate counts ($2.33\ \log_{10}$ CFU/g in herring; $3.27\ \log_{10}$ CFU/g in salmon) and eliminating detectable yeasts and molds. High-temperature methods slightly increased lipid oxidation but successfully suppressed biogenic amine formation (histamine dropped to ≤ 0.27 mg/100 g or undetectable levels) and nitrogenous spoilage indicators (TVB-N, TMA). Hot smoking yielded the highest overall sensory acceptability, while thermal bag processing scored highest in texture profile. Thermal-barrier smoking, particularly the thermal bag method, serves as an effective, eco-friendly, clean-label, sustainable innovation in the seafood industry.

Keywords: *Anisakis Simplex*; Herring; Salmon; Smoked fish; Thermal bag smoking

Occurrence, Antibiotic Resistance Patterns, and Molecular Characterization of Some Toxigenic Bacteria Isolated from Syrian Cheese Sold in Egypt

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Several microorganisms, particularly those with a pattern of multidrug resistance, have recently been implicated in food-borne illness outbreaks connected to cheese consumption. We isolated 277, 79, and 241suspect isolates of *S. aureus, E. coli and B. cereus,* respectively from Syrian cheese brands as a result of our investigation entitled "Physicochemical and Microbiological Quality Attributes of Some Syrian Cheese Varieties Produced in Egypt " . A total of 55, 16 and 114 isolates of *S. aureus, E. coli and B. cereus*, respectively were confirmed by microscopical and biochemical identification. Identified bacterial species were phenotype according to their antimicrobial resistance pattern including multidrug resistance strains (MDR) and multiple antibiotic resistance index (MAR). The highest MDR isolates were attributed to *S. aureus* (89.0%), followed by *B. cereus* (83.3%), and finally *E. coli* (75%). 5 isolates of the highest antibiotic resistance strains representing each of *S. aureus, E. coli and B. cereus*, were subjected to molecular identification and detection of toxicogenic genes using PCR technique. In this study, all examined *S. aureus*, *E. coli* and *B. cereus* isolates (100%) expressed the 23S rRNA gene, phoA gene and groEL gene, respectively, which confirm their identification at the molecular level using PCR technique. The public health and economic importance of contamination of dairy products with the aforementioned bacterial species and their control measures were discussed.

Keyword: Syrian cheese, MDR, MAR index, Toxigenic genes, *S. aureus, E. coli* and *B. cereus*

Microbiology

Isolation, Molecular Identification, and Antimicrobial Resistance of *Clostridium perfringens* Recovered from Animal and Food Sources in Egypt: In Vitro Evaluation of Thyme Essential Oil Nanoemulsion

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Clostridium perfringens frequently found as a component of the intestinal microbiota in poultry and other animals and is frequently isolated from contaminated meat products. Under favorable conditions, however, it can act as an opportunistic pathogen responsible for a wide range of diseases in both animals and humans. Therefore, this study aimed to characterize *Clostridium perfringens* isolates recovered from different animal sources and to evaluate the antimicrobial susceptibility profiles of the recovered isolates and assess the antibacterial activity of thyme essential oil nanoemulsion. A total of 32 *C. perfringens* isolates were obtained from broiler chickens (n = 7), turkeys (n = 6), rabbits (n = 8), calves (n =5), and meat products (n = 6). Eleven representative isolates were molecularly confirmed by PCR targeting the 16S rRNA gene. Antimicrobial susceptibility testing of the 32 recovered isolates demonstrated high resistance to Lincomycin and ampicillin (100%), followed by azithromycin, clindamycin, and co-trimoxazole (93.75%), amoxicillin–clavulanic acid and vancomycin (87.5%), ceftriaxone (81.25%), erythromycin (75%), cefotaxime (50%), chloramphenicol (43.75%), gentamicin (37.5%), streptomycin (37.5%), tetracycline (25%), norfloxacin (12.5%), whereas all isolates were susceptible to imipenem and doxycycline (100% susceptibility). The antibacterial activity of thyme essential oil nanoemulsion was evaluated against five representative *C. perfringens* isolates in vitro. Transmission electron microscopy (TEM) revealed pronounced ultrastructural damage in treated *C.perfringens* cells, supporting the antibacterial activity of thyme essential oil nanoemulsion. Overall, the findings support the potential application of thyme essential oil nanoemulsion as a natural antibacterial strategy for controlling *C. perfringens* infections.

Keywords: *Clostridium perfringens;* Animal isolates; Antimicrobial resistance; multidrug resistance (MDR); Thyme essential oil; Nanoemulsion.

Integron-Mediated Resistance in Poultry-Derived *Enterobacteriaceae* and antimicrobial effect of *Laurus nobilis*: Implications for One Health

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The emergence of multidrug-resistant (MDR) Enterobacteriaceae in food-producing animals poses a significant global health threat. Poultry meat serves as a major reservoir for the dissemination of antimicrobial resistance (AMR) genes, largely facilitated by mobile genetic elements such as integrons. Within the One Health framework, novel strategies are urgently required to curb the spread of these resistance determinants. This study aimed to (i) determine the prevalence of class 1 and class 3 integrons in MDR Enterobacteriaceae isolated from retail poultry meat, and (ii) evaluate the plasmid-curing efficacy of *Laurus nobilis* (bay laurel) extracts against integron-positive MDR isolates.A total of 120 poultry fresh meat samples were collected and processed for the isolation of Enterobacteriaceae giving 89 positive isolates (74.2%).All positive isolates subjected to antimicrobial susceptibility testing to confirm MDR phenotypes. PCR amplification was employed to screen for the presence of integrase genes, specifically *intI1* and *intI3*, in the recovered isolates. Then, the integron-positive MDR isolates were cultured in the presence of ethanolic *Laurus nobilis* leaf extracts. Then repeat the antimicrobial susceptibility testing monitoring the antibiotic sensitivity in the treated bacterial srains. Bacteriological analysis confirmed the isolation of MDR Enterobacteriaceae 68 isolates (76.4%) from the poultry samples. Molecular screening revealed a substantial prevalence of integrons among the selected isolates. Class 1 integrons (*intI1*) were detected in (66.7%), while class 3 integrons (*intI3*) were identified in (83.3%). Importantly, treatment with *Laurus nobilis* extracts demonstrated a significant antimicrobial effect on the integron-positive isolates. The cured strains exhibited a marked reduction in resistance gene carriage and showed restored sensitivity to multiple conventional antibiotics, indicating the successful elimination or loss of resistance-conferring plasmids.This study reveals a high prevalence of integron-mediated resistance genes in poultry-derived Enterobacteriaceae, highlighting the critical role of the food chain in AMR dissemination. Furthermore, the positive plasmid-curing activity of *Laurus nobilis* suggests its potential utility as a natural, phytogenic adjuvant to reverse AMR in veterinary and clinical settings. These findings support the integration of plant-based antimicrobial strategies into the One Health approach, bridging the gap between animal health, food safety, and environmental stewardship.

Keywords: Enterobacteriaceae, integrons, multidrug resistance, poultry meat, *Laurus nobilis*, plasmid curing, One Health.

Molecular Characterization of Multidrug-Resistant Streptococcus agalactiae from Bovine Mastitis: A Rising Superbug Threat with Vancomycin Resistance

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Streptococcus agalactiae (Group B Streptococcus, GBS) is an important pathogen in both veterinary and human medicine. In dairy cattle, it remains a major cause of contagious bovine mastitis, resulting in substantial economic losses. In humans, it can cause invasive disease in pregnant women, neonates, and immunocompromised individuals. The circulation of virulent and antimicrobial-resistant GBS strains in livestock presents a notable One Health concern, especially in regions with intensive antimicrobial use. In Egypt, most small- and medium-sized dairy farms do not routinely apply dry cow therapy, contributing to persistent intramammary infections and sustaining the transmission of contagious pathogens such as *S. agalactiae*. This study aimed to characterize key virulence determinants and antimicrobial resistance (AMR) genes in *S. agalactiae* isolated from bovine clinical mastitis in Gharbia Governorate, Egypt, and to report the emergence of vanA-mediated vancomycin resistance.Milk samples were collected from cows with clinical mastitis in small- to medium-scale herds. Phenotypic identification of *S. agalactiae* was followed by molecular confirmation using 16S rRNA gene sequencing. Eight virulence and AMR-related genes—CAMP, cylE, rib, hyl, Pbp1A, tetO, aac(6')-aph(2"), and vanA—were screened by polymerase chain reaction (PCR). Three vanA-positive isolates were sequenced and deposited in the NCBI GenBank database under accession numbers PQ317939 (TANTA1), PQ317940 (TANTA2), and PQ317941 (TANTA3). Gene prevalence and distribution were analyzed to assess virulence potential and multidrug resistance (MDR) patterns. Sixteen isolates were initially identified as *S. agalactiae*, of which 14 (87.5%) were confirmed by 16S rRNA sequencing. All confirmed isolates carried CAMP, tetO, Pbp1A, and aac(6')-aph(2") (100%). The prevalence of additional virulence genes was 92.9% for cylE, 85.7% for rib, and 78.6% for hyl. The vanA gene, associated with high-level vancomycin resistance, was detected in 28.6% of isolates. All vanA-positive isolates carried the full panel of tested virulence and AMR genes, indicating a combination of strong pathogenic potential and MDR features. This study provides the first molecular evidence of vancomycin-resistant *S. agalactiae* in Egypt, with publicly archived sequences. The coexistence of multiple virulence factors and AMR genes in *S. agalactiae* from Egyptian dairy herds reflects the emergence of highly virulent, MDR GBS lineages. The detection of vanA-positive strains (TANTA1–TANTA3; PQ317939–PQ317941) highlights a significant threat to mastitis control, therapeutic success, and potential zoonotic transmission. Enhanced molecular surveillance, responsible antimicrobial use, and One Health-based control strategies are urgently required to limit the spread of these high-risk clones.

Keywords: *Streptococcus agalactiae*, Multidrug-resistance, Vancomycin resistance, Virulence factors.

Poultry Diseases

Investigation on Some Infectious Causes of Lameness in Broiler Chickens

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One of the primary reasons for poor poultry welfare and significant financial losses in the production of broiler chickens globally is lameness or leg infections. During the present study twenty samples from each of the 10 broiler chicken farms (represented 200 samples) suffering from lameness to determine the probable infectious causes involved in induction of lameness at these farms. Bacteriological investigation revealed the predominant identification of *Staphylococcus spp*. at the examined farms 77% (154/ 200). *S. aureus* was identified at 39 samples (19.5%), mainly from thigh bone marrow and leg joints, as mono infection at six farms and as co-infection at three farms. *Salmonella spp.* was identified at one farm *(S. Anatum O:3,10,15,34,H:e,h:1,6)* as co-infection with avian reovirus. Antimicrobial susceptibility revealed marked significant antimicrobial resistance (AMR) among *S. aureus* and *S. Anatum.* PCR revealed identification of coa, spa and clfA virulence genes in 62.5%, 75% and 75% of coagulase positive *S. aureus* isolates, respectively. Viral investigation revealed detection of Marek's disease virus (MDV) at two farms (20%), as co-infection with *S.* aureus. DNA sequences of BamH1-H region were uploaded to the Gene Bank with accession numbersPX481698 and PX481699. Phylogenetic analysis revealed the close genetic relatedness with the very virulent (vv) strains of MDV and a high amino acid identity (99.3%) with the vaccine strains. Besides, avian reovirus (ARV) was identified from two farms (20%), one farm as co-infection with *S. aureus* and the other as co-infection with *S. Anatum*. This study indicated the prevalent identification of *S. aureus* from broiler farms suffering lameness. Besides, MDV still to be identified although the close relation to the vaccine strains, raising the attention toward vaccine evaluation.

Pathological, Molecular, Immunohistochemical, and Serological Diagnosis of Avian Leucosis Virus Type J in Naturally Infected Chickens

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This study was conducted to diagnose the avian leucosis virus type J (ALV-J) in naturally infected chickens in Egypt. Molecular characterization, pathological, immunohistochemical, and serological techniques were investigated. Isolation of the virus on chicken embryo rough (CER) was also performed. During the period 2016-2019, twenty-eight breeder and layer farms were investigated. These farm were located in 3 Governorates; El-Sharqia, El-Dakahliya and Al-Qalyubiyya. Blood serum and tissue samples from different organs were collected from infected chickens. Morbidity rate in affected flocks ranged from 1.2% to 3.4%. Mortality rate ranged from 0.6% to 1.8% per week. The total positive samples for antibodies of ALV-J detected were 122 (36.4%). The DNA of ALV-J was detected in 65 positive samples (69.9%) from total 93 tissue samples from liver, spleen and kidney. Gross lesions of liver, kidney and spleen were mostly greatly uniformly enlarged. Tumors of myelocytomatosis can be recognized on the surface of bones in association with the periosteum and cartilaginous areas. Histopathological examination showed tumors consist of masses of uniform, usually well-differentiated myelocytes or lymphoid cells or both in the same organ. These myeloid cells appeared as granules brilliant red when stained with Giemsa stain. Immunohistochemical examination showed that the ALV-J positive signals were mainly presented in spleen, liver, ovary, oviduct, lung, proventriculus and kidney. In conclusion, ALV-J infection in flocks could be provisionally diagnosed by pathological picture of characteristic tumors then confirmed by molecular investigations. Immunoreactivity of ALV antigens were detected in lung, kidney, spleen, liver, ovary, oviduct and proventriculus.

Keywords: Breeder chickens, myeloid leucosis, PCR, Pathology, immunohistochemistry.

Marek's Disease in Layer Chickens in Egypt: A Pathological, Molecular and Immunohistochemical Study

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Marek's disease (MD) is an economically important neoplastic disease of chickens caused by Marek's disease virus (MDV). The present study aimed to investigate Marek's disease in commercial layer chickens in Egypt using pathological, molecular, and immunohistochemical approaches. A total of 20 layer chickens showing clinical signs and/or gross lesions suggestive of Marek's disease were examined. A tissue samples from affected organs, particularly the peripheral nerves, liver, spleen, and kidney were collected. Representative tissue specimens were subjected to histopathological examination to characterize the associated lesions. Molecular detection of MDV was performed using polymerase chain reaction (PCR) targeting *meq* gene. Immunohistochemical examination was conducted using antibodies against *meq* antigen to demonstrate the distribution and localization of viral antigen within affected tissues. Histopathological examination demonstrated characteristic lymphoid proliferative lesions, ranging from lymphocytic infiltration and perivascular cuffing to diffuse or nodular lymphomatous proliferation in affected organs. Molecular examination confirmed the presence of MDV DNA in 80% of the examined samples. Immunohistochemical staining demonstrated MDV antigen within [specific cell types/tissues], with variable staining intensity and distribution among the examined organs. The pathological findings were consistent with the molecular and immunohistochemical results, supporting the diagnosis of Marek's disease. In conclusion, the combined application of histopathology, PCR, and immunohistochemistry proved valuable for confirming MDV infection and characterizing the associated tissue lesions. These findings highlight the continued occurrence of Marek's disease in Egyptian layer flocks and emphasize the importance of integrated diagnostic approaches for accurate detection and epidemiological surveillance of MDV.

Keywords: Marek's disease; layers; Egypt; histopathology; immunohistochemistry; lymphoproliferative lesions.

Protective Role of Green Tea and Thyme Extracts and Green-Synthesized Iron Nanoparticles against Aflatoxin Toxicity in Rabbits

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The study evaluated the protective effects of green tea extract (GT), thyme extract (TH), and biosynthesized iron nanoparticles (Nano-Fe) against aflatoxin B_1 (AFB_1) toxicity in rabbits. The experimental design involved ten rabbit groups (n = 15 each) receiving distinct dietary treatments. Control animals consumed a standard pellet diet, while separate groups received green tea extract, thyme extract, or iron nanoparticles. A combined supplementation group was also included to assess potential synergistic effects of these bioactive additives. To evaluate aflatoxin B_1 (AFB_1) toxicity and mitigation, additional groups were fed diets containing 50 µg AFB_1/kg feed, either alone or combined with green tea, thyme, iron nanoparticles, or their mixture. This structured grouping enabled systematic comparison of protective interventions against AFB_1-induced effects under controlled experimental conditions. Iron nanoparticles synthesized using plant extracts were uniformly spherical (≈9 nm), highly stable (zeta potential +32.8 mV), and moderately biocompatible (IC_{50} ≈ 94 µg/mL). Rabbits exposed to AFB_1 showed impaired growth, hepatic and renal dysfunction, oxidative stress, mineral imbalance, systemic inflammation, and tissue aflatoxin accumulation. Supplementation with GT, TH, and Nano-Fe—individually or in combination ameliorated these adverse effects. The combined treatment (GT+TH+Nano-Fe) provided the strongest protection, improving weight gain and feed efficiency, restoring liver and kidney biomarkers, enhancing antioxidant defenses, reducing inflammatory cytokines, and minimizing aflatoxin residues, particularly in edible muscle tissue. As conclusion these findings highlight the synergistic potential of phytogenic extracts and green-synthesized nanominerals as a natural strategy to enhance animal health, mitigate mycotoxin risks, and improve food safety.

Keywords: Aflatoxin B_1, green tea extract, thyme extract, iron nanoparticles, oxidative stress, rabbit performance, residue reduction, nanotechnology

Optimization of Newcastle Disease Virus Genotype VII Inactivation for Safe and High Quality Vaccine Antigen Manufacturing

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Inactivation of Newcastle Disease Virus (Genotype VII) for vaccine manufacturing requires balancing complete viral inactivation with surface antigen preservation. Formalin (FA) mono treatment frequently causes cross linking induced epitope destruction and loss of hemagglutinating (HA) activity, whereas Binary Ethylenimine (BEI) treatment may exhibit reduced long term antigen stability over extended shelf life. To overcome these limitations, this study evaluated a synergistic dual inactivation strategy combining low dose BEI with trace concentration of FA. Specifically, inactivation with FA alone (0.1%) at 37ºC caused a total loss of HA activity (0 log_2) by 24 hours. In contrast, the synergistic dual formulation (5 mM BEI + 0.1% FA) achieved complete viral inactivation within 22 hours at 37ºC while retaining maximum antigenic integrity with HA titer of 10.0 log_2. Long term stability monitoring over 3 months demonstrated that the dual formulation maintained an unchanged HA titer (10.0 log_2), outperforming 5 mM BEI alone, which showed a noticeable decline to 8.0 log_2 by month 2 post inactivation. Serological evaluation in SPF chicks revealed that the dual formulation induced the earliest and most robust antibody response by week 2 post vaccination. Furthermore, both dual and BEI treated formulations elicited significantly higher antibody titers than the traditional FA inactivated vaccine. Following virulent NDV-GVII challenge, all vaccinated groups achieved 100% protection, whereas the control group remained seronegative and succumbed to infection. In conclusion, combining 5 mM BEI with 0.1% FA overcomes single agent drawbacks, providing an exceptionally stable, highly immunogenic, and commercially viable candidate for NDV-GVII vaccine production.

Keywords: Newcastle disease virus, Genotype VII, Binary Ethylenimine, Formalin, Dual.

Avian Neuropathology: A Comprehensive Review of Neuropathological Changes, Mechanisms, and Emerging Toxicological Insights

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Avian neuropathology represents an important and expanding field that connects neurological health with environmental toxicology, veterinary pathology, and ecological conservation. Birds possess highly specialized nervous systems that making them valuable models for investigating neurotoxic mechanisms and monitoring environmental contamination. This review provides a comprehensive overview of avian neuropathology, with particular emphasis on neurotoxic exposure, pathological mechanisms, biomarkers, and emerging technologies. Major non-toxicological causes of neurological disease, including infectious agents, nutritional deficiencies, metabolic disorders, and hypoxic–ischemic injury, are first considered to establish an appropriate differential diagnostic framework. The review then examines important classes of avian neurotoxicants, including pesticides and insecticides, heavy metals, mycotoxins, industrial contaminants, pharmaceuticals, emerging contaminants, nanomaterials, and micro- and nanoplastics. Their effects are discussed in relation to oxidative stress, mitochondrial dysfunction, excitotoxicity, neuroinflammation, apoptosis, neurotransmitter disruption, blood–brain barrier impairment, and vascular injury. Characteristic neuropathological alterations, including neuronal degeneration, gliosis, cerebellar and cerebral lesions, axonal and myelin abnormalities, vascular changes, and ultrastructural damage, are summarized alongside molecular, cellular, histological, and immunohistochemical biomarkers. Recent advances in molecular pathology, transcriptomics, proteomics, metabolomics, electron microscopy, immunohistochemistry, and artificial intelligence-assisted digital histopathology are highlighted as promising approaches for improving mechanistic understanding and diagnostic accuracy. Finally, current limitations and future perspectives are discussed, emphasizing species-specific research, environmentally realistic exposure scenarios, mixture toxicology, developmental neurotoxicity, non-lethal monitoring, and integration of neuropathological, molecular, behavioral, and ecological endpoints. Collectively, this review highlights the need for an integrated and predictive framework to understand how environmental neurotoxicants affect avian health and ecosystem integrity.

Keywords: Avian neuropathology; Neurotoxicity; Neurotoxicants; Oxidative stress; Environmental contaminants.

Tracking a new IBDV variant in Egyptian chickens and their impact on complex respiratory disease in broiler flocks.

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The infectious bursal disease virus (IBDV) is a persistent, immunosuppressive infection that can survive in various environments and resist strong disinfectants. Novel variation nVar-IBDV: classical virulent, attenuated, and very virulent IBDV are the most prevalent circulating immunosuppressive diseases in Egypt. This study aimed to assess the status of IBDV in Egyptian broiler flocks and its role in the development of complex respiratory disease. This surveillance was conducted from 2020 to 2025 on commercial broiler chicken farms in Egypt to clarify the significance of IBDV as an immunosuppressive disease in exacerbating other respiratory viral diseases. The monitoring covered eight governorates: Giza, Cairo, Ismailia, Behira, Sharika, South Sinai, Fayom, and Dakahlia. Virus detection and molecular identification were performed for detected strains. The prevalence of IBDV among the collected samples from the studied governorates was 79%. The distribution of positive samples revealed that 30% were documented in Ismailia, 20% in Sharika, 16% in Cairo, 9% in South Sinai, 9% in Dakahlia, 6% in Giza, 6% in Behira, and 4% in Fayom. 68% of positive PCR IBD samples were co-infected with other respiratory pathogens, whereas 32% were single IBD virus infection. The mixed infections indicated that 58% were associated with H9N2, 22% with NDV, and 20% with IBV. This investigation validates the presence of nVar-IBDV in Egypt using partial VP2 sequencing. This work supports the high prevalence of IBDV, particularly nVar-IBDV, and demonstrates its immunosuppressive impact, that increases susceptibility to respiratory co-infections, including H9N2, NDV, and IBV.

Keywords: IBDV; chicken, phylogenetic analysis, Egypt

Epidemiological and Molecular Prevalence of Newcastle Disease Virus from different Egyptian flocks in (2023-2025)

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Poultry industry is a very important sector of global economics highly affected by viral challenges. Among viral infections, Newcastle disease virus (NDV) is one of the most infectious threats to the poultry industry, as it causes high mortality, a drastic drop in egg production, and severe economic losses in poultry flocks. The virus can infect most of bird species, indicating its broad host range. A molecular prevalence survey across Egypt during (2023-2025) was conducted, with 99 samples, each representing a single location from different governorates: 23-Cairo, 13-Qalyubia, 21-Shakia, 27-Giza, 4-Fayoum, 5-Beheira, 2-Wadi Gadid, 2-Alexandria, and 2-Assiut. Positive samples were 35, representing 35.4%. Among positive samples, 12 were chosen for sequencing; 9 were classified as NDV GVII1.1, 2 as Lasota-like, and 1 VG/GA sequence also showed a change in pathogenicity. It is a major concern to overcome this ongoing, threatening viral infection through the application of strict biosecurity measures and well-matched vaccination protocols that include Live attenuated vaccines, inactivated NDV vaccines, immunomodulating substances, and enhanced recombinant vaccines, all of which have been used to vaccinate birds against NDV. Unfortunately, the disease continues to strike, causing severe outbreaks. Therefore, the purpose of the present work is to provide an updated molecular prevalence and classification that might help focus on representing vaccination solutions.

Keywords: Newcastle disease virus, NDV classification, Molecular prevalence, sequencing.

Aquatic Diseases

Electrocoagulation in Recirculating Aquaculture Systems: An Innovative and Sustainable Strategy for Improving Water Quality, Reducing Contaminant Bioaccumulation, and Enhancing Fish Safety

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Electrocoagulation (EC) is a promising advanced approach that depends upon application of direct current (DC) to stimulate the release of active ions from metal electrodes. In this recirculating aquaculture, water is safely pumped from culturing ponds into an external EC reactor, where highly reactive coagulant ions are generated. This technology chelates the chemical pollutants and disrupts the microbial membrane. This study aimed to evaluate the efficiency of unipolar (parallel electrode connections) and bipolar (indirectly powered inner electrodes) EC systems operated at 24 V and 5 A against untreated pond to ensure the safety of Nile Tilapia (Oreochromis niloticus) for human consumption. A total of 150 fish were distributed across three experimental glass ponds and monitored over a 5-day period. The findings revealed an improvement in the microbiological and chemical status of water and edible tissues regarding bipolar and unipolar compared to control over 5 days. Aldrin pesticides remained high in control (9.6 ppb in fish flesh, 98.7 ppb in water) while bipolar system showed superiority in decreasing aldrin pesticides (5.6 ppb in fish flesh, 70.3 ppb in water) compared to unipolar (7.7 ppb in fish flesh, 77.4 ppb in water) over 5 days. Heavy metals exhibited reduced bioaccumulation (Zinc, copper and iron) in fish tissue and water, respectively as the following for bipolar (0.01, 0.01, and 0.02 µg/g in fish tissue; 0.06, 0.02, and 0.01 mg/L in water), unipolar (0.02, 0.01, and 0.03 µg/g in fish tissue; 0.08, 0.03, and 0.02 mg/L in water) compared to control (0.07, 0.05, and 0.09 µg/g in fish tissue; 0.095, 0.07, and 0.05 mg/L in water). Lead and cadmium were undetectable in fish flesh and water throughout the experiment including control sample. Total Coliform Count reduced significantly in bipolar system to 7.50×10^3 CFU/mL and 1.50×10^3 CFU/g compared to unipolar (21.90×10^3 CFU/mL and 2.01×10^3 CFU/g) and control (25.23×10^3 CFU/mL and 5.23×10^3 CFU/g) regarding water and fish flesh, respectively. Physicochemical parameters were stabilized from their initial baseline, the bipolar EC revealed clearance of waterborne nitrates (to 3.20 mg/L compared to 4.10 mg/L in the unipolar and initial 4.40 mg/L baseline) while pH values showed improvement from the initial pH 8.1 to 6.90 and 7.10 in the bipolar and unipolar system, respectively. The application of bipolar electrocoagulation serves as a highly efficient and sustainable intervention to control microbial growth, the elimination of chemical hazards in aquaculture and ensures the production of safe fish that comply with food hygiene standards.

Evaluating the Single and Combined Effects of Dietary Black Soldier Fly Oil, Probiotics, and Immunostimulants on Nile Tilapia (*Oreochromis niloticus*) Juveniles: Growth, Health, and Immunity

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The global aquaculture industry has grown markedly, with significant expansion in the Egyptian aquaculture production. The transition toward sustainable aquaculture necessitates the integration of specialized feed additives to optimize feed conversion, growth performance, and immune response, while reducing the incidence of diseases and economic costs. Hence, various ingredients have been utilized as feed additives in fish diets, such as probiotics, prebiotics, essential oils, organic acids, microalgae, organic trace minerals, exogenous enzymes, and insect meals. Many families of insects, such as Coleoptera and Diptera, including black soldier fly (BSF) (*Hermetia illucens Linnaeus*), common houseflies (*Musca domestica),* and mealworm beetles (*Tenebrio molitor*) have been studied as feed component substitutes or feed additives in the diet of different fish species. Black Soldier Fly Oil (BSFO) has emerged as a promising nutritional additive and can be strategically incorporated into the fish diet to enhance feed efficiency and support the physiological health of the species. BSFO is rich in lauric, palmitic, myristic, α-linolenic, and oleic acids. In the current study, Nile tilapia (*Oreochromis niloticus*) juveniles weighing 60 ± 5 g were randomly divided into eight groups: a control group (fed a basal diet), two groups fed diet containing 0.05% and 0.1% BSFO, respectively, two groups fed diet containing 0.05% or 0.1% BSFO supplemented with water-administered probiotics, and two groups fed diet containing 0.05% or 0.1% BSFO in addition to 4% immunostimulant, and the last group fed diet with 4% immunostimulant. At the end of the 7-week study, total body weight gain was determined, and tissue samples were collected to assess the antioxidant activity (malondialdehyde concentration, superoxide dismutase, catalase activity, and total antioxidant capacity), immunomodulation (gene expression of *TCR* and *TLR-7*), and histopathological alterations. The results showed that the highest performance was observed in the group fed diet containing 0.05% BSFO with probiotics in water, followed by the group fed diet containing 0.05% BSFO and 4% immunostimulant when compared to the control group. Overall, the findings obtained from the current study indicate that the synergistic interaction between optimal inclusion rates of BSFO as a feed additive and probiotic water supplement positively impacts fish performance, immune status, and economic profitability.

Innovative approaches to water and fish quality improvement: A comparative analysis of physio -chemical coagulants

Khalid Tolba[1]; Huda Elsayed[1]; Ahmed M. Mostafa[1]; Mona Momtaz M. Abd El-aziz[1]; Amani Abd El latif Mosleh[2]; Azza M. Abdelmoteleb[3]; Nashwa M. Zaki[4]; Shaimaa, M., Tony[5]; Diaa Eldin Ezzat Hussein[6]; Maha A. El-Hady[7]; Shabana E S E[1]; Bedeir Ibrahim Agag[3]; Farag, Enas A.H.[8]; Rasha M.H. Sayed-ElAhl[9]; Abedelrhman mohamed Gamal[10]; Hanan Saad Khalefa[10]

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The accumulation of chemical pollutants in farmed fish has a potential risk on food safety and public health. There is a necessity to use sustainable solutions that mitigate these hazards. This study aimed to determine the efficacy of *Moringa oleifera* leaf extract and sodium gluconate each individually and together as a green technology to diminish chemicals accumulation in Nile tilapia (*Oreochromis niloticus*) muscles, water and decrease microbial loads subsequently improve water quality and fish growth. One hundred Nile tilapia fish were distributed into four experimental glass ponds intentionally contaminated with aldrin (0.03 g/L) and malachite green (0.3 g/L). The experimental groups were divided into a control, *M. oleifera* (50 mg/L), sodium gluconate (50 mg/L), and a dual application of substances. Water and fish muscle samples were analyzed at 1, 3, 6, 9, 12, 15, 18, and 21 days for physicochemical parameters, heavy metals (Cu, Zn, Fe), aldrin and malachite, and microbiological quality. The findings revealed that the dual combination of agents provided the most significant protective effect ($P < 0.05$). Aldrin and acid malachite green residues declined from 208.11 to 49.01 ppb, and from 2.33 to 1.01 ppb in fish muscles while in water declined from 223.31 to 109.30 ppb and from 3.12 to 1.42 ppb, respectively by day twenty-one. Copper, iron and zinc bioaccumulation was significantly mitigated reaching undetectable levels earlier in the combined treatment group in both fish muscles and water. Additionally, this dual combination enhanced water quality by stabilizing pH, reducing solid fluctuations and a significantly decreasing in total coliform counts in edible fish flesh ($P < 0.05$). Aerobic plate counts (APC) in both water and fish, alongside coliform counts in water manifested numerical decline that did not reach statistical significance ($P > 0.05$). In conclusion, the synergistic application of *M. oleifera* extract and sodium gluconate offers a highly effective, sustainable, ecofriendly approach to safeguard food safety, environment and public health.

Veterinary Surgery

Innovative strategies on accelerating skin wound healing in dogs using chitosan coated zinc oxide nanoparticles based on two different routes

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Nanotechnology, particularly zinc oxide nanoparticles (ZnO NPs), has shown promise for its antibacterial, anti-inflammatory, and regenerative capabilities. Chitosan-coating metal oxide NPs have higher solubility and bioactivity than uncoated metal oxide NPs, making them an effective biomaterial for medical uses. This study aims to exploit the complementary features of chitosan-coated ZnO NPs (CS/ZnO NPs) to overcome existing limits in wound care treatments through selecting two key routes: subcutaneous injection (s/c) and topical application (T). Fifteen dogs were divided into 3 groups (n = 5) as follows: control group, group treated by subcutaneous injection of CS/ZnO NPs (25 ppm) once a week for 2 weeks, group treated by daily topical application of CS/ZnO NPs (25 ppm) for 2 weeks. Wounds were monitored grossly and microscopically at 0, 3rd, 7th, 14th, and 21st days post-treatment. Administration of CS/ZnO NPs either s/c or T accelerated wound closure more than the control group without affecting liver and kidney function biomarkers, but the s/c route makes a significant deterioration in some haematological parameters such as HB, HCT, RBCs, WBCs, and platelets count compared with the T route. Microscopic examination revealed improved epithelialization, decreased inflammatory cell infiltration, greater collagen deposition, and superior tissue organization in wounds treated with CS/ZnO NPs over time that confirmed by increasing VEGF and αSMA immunoexpression. CS/ZnO NPs also boosted the transcriptase levels of VEGFA and TNF-α genes all time-points. This study demonstrates the benefits of nanotechnology in wound care and emphasizes the need for additional research to enhance nanoparticle formulations for therapeutic applications.

Keywords: Chitosan, Gene expression, Histopathology, Wound healing, ZnO NPs

Zoonoses

Underpinning the Molecular Barriers to Emergence of Novel Viruses

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Bats are reservoirs for many coronaviruses and henipaviruses, which pose public health and potential pandemic impacts. Exploring cellular barriers to viral infection in bats at the molecular level can broaden our understanding of virus biology in these mammals. Among cellular factors, angiotensin-converting enzyme (ACE2) and epitranscriptomic marks mainly attributed to N6-methyladenosine (m6A) represent a crucial intersection in contemporary molecular biology; however, their role in bats remains elusive in relation to viral infection. In this study, we explored the role of m6A and ACE2 as key barriers determining the susceptibility of *Rousettus aegyptiacus* bat (RE) to HKU5 coronavirus and Cedar henipavirus using a wide range of molecular, virological, and in silico techniques. Infection of RE cells with HKU5 resulted in abortive infection. Overexpression of RE-ACE2 enhanced viral replication and release in bat cells, whereas ectopic expression of human angiotensin-converting enzyme 2 (hACE2) achieved higher infection. Furthermore, RE-ACE2 was detected among the top ten differentially expressed genes upregulated in RE cells in response to HKU5. Using RE cell lines stably expressing the m6A writer METTL3, we have demonstrated that RE METTL3 inhibited the replication of Cedar virus, whereas no obvious impact was observed against HKU5 virus. These primary studies highlighted the role of ACE2 and m6A as a key host barrier to the emergence of coronaviruses and henipaviruses in bats and shed light on the RE as a potential reservoir for the SARS-like coronavirus.

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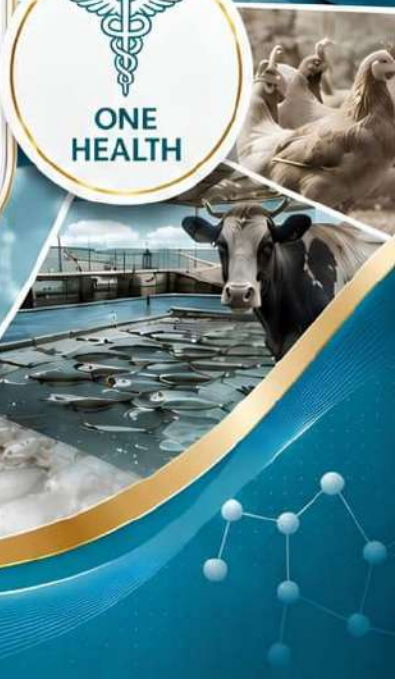

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