Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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**Conclusion** This systematic review showed that increased CRP levels appeared to have a trend towards a higher probability of developing DHF/DSS. However, a larger population size and more studies are needed to further establish a statistically significant relationship.

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PP145

Generating and characterizing of monoclonal antibody against non-structural proteins one of Zika virus

C. Lin

Kaohsiung Medical University

Zika virus belongs to Flaviviridae family. For flaviviruses, NS1 protein has been used as a marker for early infection diagnosis and to trigger protective antibodies. Currently, there is no drug or vaccine available to treat and prevent the Zika virus. The purpose of this study is to produce an anti-Zika NS1 monoclonal antibody and to identify the characteristics of monoclonal antibodies and their application in the diagnosis of the Zika virus. Firstly, the mice were immunized with Zika virus NS1 recombinant proteins of SPH2015 virus. The monoclonal antibodies produced in mice sera were detected by ELISA. The monoclonal antibodies were then prepared by the fusion tumor technique and restrictive dilution method. 6 monoclonal antibodies (4-1E, 4-1H, 4-3C, 5-5E, 5-5F, 5-7H) were selected. The binding properties of monoclonal antibodies were evaluated by ELISA and denatured and non-denatured Western Blot. The results showed that 6 monoclonal antibodies bind to both structural and liner antigens. Then, phage display was used to identify the antigen sites of a monoclonal antibody. The results showed that the antigen sites identified by 4-1E antibody were 225, 226, 244 and 246. The antigen sites identified by 4-1H antibody were 100, 102 and 103. The antigen sites identified by 4-3C antibody were 17, 18 and 19. The antigen sites identified by 5-5E antibody were 57, 58, 60 and 62. The antigen sites identified by 5-5F antibody were 103, 104 and 106. The antigen sites identified by 5-7H antibody were 97, 98 and 100.

Next, we evaluated the neutralizing properties of these monoclonal antibodies by FRNT. The results showed that neutralizing ability to Zika virus was not detected. Following these results, these monoclonal antibodies will be used to establish a detection platform for Zika virus and to evaluate whether these monoclonal antibodies may display protective ability by using in vivo mouse models.

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PP146

Cross-sectional prevalence study of MERS-CoV in local and imported dromedary camels in Saudi Arabia, 2016-2018

A. Tolah1,2, S. Al-Masaud2, S. El-Kafrawy1,3, A. Mirza4, S. Harakeh1,3, A. Hassan1, A. Alzahrani4, G. Alaaidi4, A. Alagaili5, A. Hashem1,6,7, E. Azharn1,3

1 Special Infectious Agents Unit, King Fahd Medical Research Center, King Abdulaziz University, Jeddah, Saudi Arabia
2 Department of Biological Science, Division of Microbiology, Faculty of science, King Abdulaziz University, Jeddah, Saudi Arabia
3 Department of Medical Laboratory Technology, Faculty of Applied Medical Sciences, King Abdulaziz University, Jeddah, Saudi Arabia
4 Directorate of Agriculture, Ministry of Environment Water and Agriculture, Makkah Region, Saudi Arabia
5 KSU Mammals Research Chair, Department of Zoology, College of Science, King Saud University, Riyadh, Saudi Arabia
6 Vaccines and Immunotherapy Unit, King Fahd Medical Research Center, King Abdulaziz University, Jeddah, Saudi Arabia
7 Department of Medical Microbiology and Parasitology, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

The Middle East Respiratory Syndrome-Coronavirus (MERS-CoV) is an endemic virus in Middle Eastern and African dromedaries. Annually, Saudi Arabia imports thousands of camels from the Horn of Africa, yet the epidemiology of the virus in these animals is largely unknown. Here, MERS-CoV prevalence was compared in imported African camels and their local counterparts. A total of 1399 paired sera and nasal swabs were collected between 2016 and 2018 from camels from Sudan (n = 829), Djibouti (n = 328) and Jeddah (n = 242). Imported animals were sampled on incoming ships at Jeddah Islamic seaport before unloading. Samples were screened for neutralizing antibodies (nAbs) and MERS-CoV viral RNA by RT-PCR.

The overall seroprevalence was 92.7% and RNA detection rate was 17.2%. Imported camels had higher seroprevalence compared to resident herds (93.8% vs 87.6%, p < 0.01) in contrast to RNA detection (13.3% vs 35.5%, p < 0.0001). Seroprevalence significantly increased with age (p < 0.0001) and viral RNA detection rate was 2-folds in camels < 2-year-old compared to older camels. RNA detection was higher in males verses females (24.3% vs 12.6%, p < 0.0001) but seroprevalence was similar. Concurrent positivity for viral RNA and nAbs was found in > 87% of the RNA positive animals, increased with age and was sex-dependent. Importantly, reduced viral RNA load was positively correlated with nAb titers.

Our data confirm MERS-CoV widespread in imported and domestic camels in Saudi Arabia and highlight the need for continuous active surveillance and better prevention measures. Further studies are also warranted to understand the correlates of protection in camels for proper vaccine development.

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PP147

MERS-CoV infection is associated with downregulation of genes encoding Th1 and Th2 cytokines/chemokines and elevated inflammatory innate immune response in the lower respiratory tract

B. Alosaimi1,2,3, M. Awadalla1,2,3, M. Enani1,2,3

1 King Fahd Medical City, College of Medicine, Research Center
2 King Saud University, College of Science
3 Medical Specialties Department, Section of Infectious Diseases, King Fahd Medical City

**Background and Purpose** MERS-CoV, a highly pathogenic virus in humans, is associated with high morbidity and case fatality. Inflammatory responses have a significant impact on MERS-CoV pathogenesis and disease outcome. However, CD4+ T-cell induced immune responses during acute MERS-CoV infection are barely detectable, with potent inhibition of effector T cells and down-
regulation of antigen presentation. The local pulmonary immune response, particularly the Th1/Th2 immune response during acute MERS-CoV infection is not fully understood. The purpose of this study was to study the pulmonary gene expression profile of Th1 and Th2-related cytokines, chemokines, and receptors (Th1 & Th2 responses) during acute MERS-CoV infection using RT² Profiler PCR Arrays and expression level of primary inflammatory cytokines/chemokines. Results and Discussions: Our results showed a downregulation of Th2, inadequate (partial) Th1 immune response and high expression levels of inflammatory cytokines IL-1α and IL-1β and the neutrophil chemotactant chemokine IL-8 (CXCL8) in the lower respiratory tract of MERS-CoV infected patients. Moreover, we identified a high viral load in all included patients. Genes encoding Th1 and Th2 cytokines/chemokines were largely downregulated in the lower respiratory tract of MERS-CoV infected patients, with selective upregulation of IL-18, CXCR3, SOCS5, and CCR2. It is possible that overexpression of IL-1α, IL-1β, IL-8 (CXCL8), IL-18, CXCR3, SOCS5, and CCR2 play a vital role in the severity, immunopathology, and case fatality of MERS-CoV infected patients. We observed a correlation between inflammatory cytokines, Th1, and Th2 downregulation and the case fatality rate.

Conclusions Th1 and Th2 response downregulation, high expression of inflammatory cytokines, and high viral load may contribute to lung inflammation, severe infection, the evolution of pneumonia and ARDS, and a higher case fatality rate. Further study of the molecular mechanisms underlying the Th1 and Th2 regulatory pathways will be vital for active vaccine development and the identification of novel therapeutic strategies.

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PP148

Molecular Epidemiology of Human Adenovirus Infections in Saudi Arabia Pediatric Patients

S. Haddad 1,2, M. Aly 1,2, S. Al-Johani 2,3, M. Alghoribi 1,2, H. Balkhy 4

1 King Abdullah International Medical Research Center, Infectious Disease Research Department
2 King Saud bin Abdulaziz University for Health Sciences
3 Department of Pathology and Laboratory Medicine, King Abdulaziz Medical City
4 World health organization (WHO)

Human adenoviruses (HADV) are one of the leading cause of acute respiratory diseases (ARD), gastroenteritis (GE), community-acquired pneumonia (CAP), urinary infections, conjunctivitis and probably obesity. The objective of this study was to characterize the variation of AD genotypes from children under 5 years old at a tertiary care hospital in Riyadh, Saudi Arabia. Between October 2013 and December 2014, a total of 620 stool samples with acute diarrhea were collected. These samples were tested for adenovirus by PCR-based molecular typing. In 2013, HADV was detected in 17.5% (56/320) of affected cases, additional 147 samples were identified HADV-positive from a total of 300 (49%) in 2014. Nucleotide sequences of all positive samples were analyzed and revealing various genotypes. Interestingly, only four genotypes were predominant during 2013 and 2014 data which are 41, 49, 52 and 1, but with different proportions. This study confirmed previous findings of Ad 41 with the highest proportion as well as AD-2, -4 and -1. Yet, adding AD-75 and AD-31 which have never been reported in Saudi Arabia. Moreover, neither sexes or seasonal affected considerably in the adenoviruses detection in Saudi Arabia. In conclusion, these data is delivering an insight into the genetics of Adenovirus in young children which will assist in understanding of genotypes involved and launching of vaccination in the country.

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PP149

Pediatric Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Infection – UAE

F. Al Kindi 1, S. Chandrasekhar Nair 2, R. Hashmey 3

1 Internal Medicine, Tawam Hospital
2 Academic Affairs, Tawam Hospital
3 Infectious Disease, Tawam Hospital

Introduction In 2012, MERS-CoV was identified in Saudi Arabia and resulted in more than 2442 confirmed cases worldwide by May 2019. MERS-CoV infection in children is less common. A review of MERS-CoV in children from 2012 to April 2016 summarized the clinical manifestation of 31 reported cases. Most children were asymptomatic or had mild respiratory symptoms, and severe infection reported in patients with comorbid conditions. We aimed to study the clinical characteristics of pediatric MERS-CoV infected cases in UAE supported by literature review.

Method A retrospective multicenter chart review study was conducted for MERS-CoV cases in Abu Dhabi Emirate (May 2012 – May 2019). Demographic, clinical and laboratory data were analyzed. We reviewed WHO outbreak surveillance reports published online to identify pediatric MERS-CoV cases from April 2016 to June 2019.

Results We describe favorable outcomes of MERS-CoV infection in three children identified in UAE. Two patients had household contact with MERS-CoV infected family members and another patient travelled to Saudi Arabia. MERS-CoV was confirmed by PCR from nasopharyngeal aspirates and duration of viral shedding ranged from 4 to 11 days. One patient was asymptomatic and other two had mild respiratory symptoms. Laboratory data and chest X rays were normal.

We reviewed WHO surveillance data and identified 11 pediatric MERS-CoV cases from April 2016 to June 2019. Mean age of 14.9 years (6 females, 5 males). The majority of pediatric outbreak was in year 2017 (8 cases) and most cases identified in Saudi Arabia. The main risk factor was household infection. Two patients died due to severe MERS-CoV infection. There are an estimated 42 pediatric MERS-CoV cases reported globally, with a mortality rate of 9.5% (4 cases).

Conclusion Pediatric MERS-CoV infection is acquired mainly through household contact. It has favorable outcomes and the mortality rate in children remains lower than adults.

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PP150

Severe Leptospirosis with Pulmonary Hemorrhage; The Role of Intravenous Hydrocortisone

D. San Pedro

Bicol Medical Center

Leptospirosis is an endemic zoonosis caused by spirochetes of the genus Leptospira that typically occurs in tropical regions. Pulmonary hemorrhage which is the frequent cause of mortality in leptospirosis is either underdiagnosed or only discovered at autopsy.