

Short communication

DURATION OF MERS - CORONAVIRUS ANTIBODIES IN A SMALL CLOSED DROMEDARY CAMEL HERD IN DUBAI

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ABSTRACT

This investigation shows that MERS-CoV ELISA antibodies remain in dromedary camels at least for 9 years, most probably lifelong. The viral infection was most likely acquired at a young age when maternal antibodies have receded between 4 to 8 month of age. Additionally, in the investigated herd, the 4 ELISA antibody negative dromedary camels remained negative also for 9 years, indicating, that no MERS-CoV was circulating in the herd. Until today, the specific source of MERS-CoV infection for young dromedaries remains unknown.

Key words: Mers - Coronavirus, dromedary camel

MERS-Coronavirus is a zoonotic virus, that can be transmitted from dromedary camels to human beings, in which it causes severe respiratory disease with a high case fatality. Dromedary calves may develop no or only mild respiratory signs and adult camels are free of the disease (Wernery *et al*, 2017). Seroepidemiological studies have found high levels of MERS-CoV antibodies in dromedary camels in the Middle East and Africa (Muller *et al*, 2014; Mackay and Arden, 2015), but not in Bactrian camels in their home country (Chan *et al*, 2015).

Unlike SARS-CoV which was eradicated from the globe by closing animal markets in China, where the palm civet cat was sold, MERS-CoV will remain in many countries where dromedary camels are reared. However, the incidence has dropped significantly over the last years. A serological MERS-CoV survey was conducted in a dromedary herd over a period of nearly 10 years, the results of which are presented here.

Materials and Methods

Twenty-two adult dromedary camels aged between 8 to 25 years and of different gender belonging to the Central Veterinary Research Laboratory (CVRL) were tested for MERS-CoV antibodies with the "Anti-MERS-CoV ELISA Camel (IgG)" from Euroimmun over a time frame of 9 years. Blood was regularly withdrawn from the jugular

vein of the camels from 2013 and last in 2022. The blood was centrifuged for 5 minutes at 4000 rpm, and serum stored at -20°C until tested. Not every time blood was collected from all dromedary camels as the test kit was not always available. However, in August 2022 blood was withdrawn from 21 animals and tested. One dromedary camel had died in 2021. All dromedary camels were donated to CVRL more than 15 years ago.

The results were evaluated semi quantitatively by calculating a ratio of the extinction value of the control or sample over the extinction value of the calibrator (provided in the test kit). According to the manufacturer of the ELISA, a ratio of < 0.8 was negative, a ratio of ≥ 0.8 to < 1.1 was borderline and a ratio of ≥ 1.1 was positive.

Results

The results of the ELISA are shown in Table 1.

In total, over 9 years the results of MERS-CoV antibodies of 22 (21) dromedary camels remained the same: 4 animals remained negative, 18 (17) remained positive.

Discussion

Twenty-two adult dromedary camels of different gender were tested over a period of 9 years for MERS-CoV antibodies with a commercial antibody (IgG) ELISA. Eighteen of the camels

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Table 1: MERS-CoV antibody results of 22 dromedary camels tested over 9 years.

| No. | Camel ID | Date of Sampling & Ratio (ELISA) | | | | | | | MERS-CoV Antibody ELISA results |
|-----|------------|----------------------------------|----------|----------|----------|----------|----------|----------|---------------------------------|
| | | 18.06.13 | 22.10.15 | 19.09.17 | 16.07.19 | 14.12.19 | 29.12.19 | 16.08.22 | |
| 1 | A44 CORINA | 0.20 | 0.08 | 0.10 | 0.07 | 0.05 | 0.05 | 0.09 | Negative |
| 2 | 973 Alia | 3.70 | 3.10 | 2.50 | 2.09 | 1.63 | 1.44 | 1.59 | Positive |
| 3 | 26 | ND | ND | ND | 2.97 | 2.50 | 3.04 | 1.98 | Positive |
| 4 | Tiny 136 | ND | 4.10 | 3.70 | 4.00 | 3.37 | 3.44 | Died | Positive |
| 5 | 6A5 | 0.06 | 0.08 | 0.08 | 0.06 | 0.06 | 0.07 | 0.13 | Negative |
| 6 | DBO | 0.09 | 0.07 | 0.12 | 0.07 | 0.08 | 0.09 | 0.25 | Negative |
| 7 | O5E | 0.20 | 0.12 | 0.10 | 0.05 | 0.07 | 0.08 | 0.22 | Negative |
| 8 | 1 | ND | 4.00 | 4.30 | 4.11 | 4.18 | 4.44 | 4.89 | Positive |
| 9 | 7 | ND | ND | ND | 3.42 | 2.55 | 2.76 | 2.84 | Positive |
| 10 | 3 | ND | ND | ND | 4.59 | 4.60 | 4.91 | 5.90 | Positive |
| 11 | 5 | ND | ND | ND | 2.48 | 2.23 | 4.72 | 2.66 | Positive |
| 12 | 4 | ND | 3.80 | ND | 3.22 | 2.54 | 5.35 | 4.40 | Positive |
| 13 | 10 | ND | ND | ND | 4.62 | ND | ND | 3.20 | Positive |
| 14 | 1702 | ND | ND | 4.50 | ND | ND | ND | 6.00 | Positive |
| 15 | 1704 | ND | ND | 4.40 | ND | ND | ND | 5.70 | Positive |
| 16 | 1705 | ND | ND | 3.20 | ND | ND | ND | 2.40 | Positive |
| 17 | 1053 | ND | ND | ND | ND | ND | ND | 4.60 | Positive |
| 18 | 24 | ND | ND | ND | ND | ND | ND | 3.80 | Positive |
| 19 | 9 | ND | ND | ND | 4.56 | ND | ND | 5.40 | Positive |
| 20 | 22 | ND | ND | ND | 4.92 | ND | ND | 6.70 | Positive |
| 21 | 29 | ND | ND | ND | 4.22 | ND | ND | 4.50 | Positive |
| 22 | 28 | ND | ND | ND | 4.46 | ND | ND | 5.10 | Positive |

ND - Not done

remained MERS-CoV antibody positive and 4 remained negative through the entire testing period. The animals were kept in different groups in 7 pens and had constant contact to each other. The result shows 2 interesting facts. No circulating MERS-CoV exist in this herd as all 4 negative dromedary camels remained negative for 9 years. The MERS-CoV ELISA antibody level remained more or less stable with few variations in the ratio, indicating that an infection at young age may produce lifelong immunity. Over many years from serological positive MERS-CoV dromedaries greater than 4 years of age, which died from different diseases and were necropsied at CVRL, no MERS-CoV had been recovered from many organ specimens (Wernery *et al*, 2017). However, MERS-CoV has been isolated from nasal swabs of young necropsied camels (Wernery, 2014), most probably when maternal

antibodies disappeared between 4 and 8 month of age, permitting infection to occur during the seronegative period (Bin *et al*, 2016).

Until today, the specific source of infection for young dromedaries remains unknown, although it is likely to be from other dromedaries.

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