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AGGLUTINATION OF CAMEL (*CAMELUS DROMEDARIUS*) AND PIGEON (*COLUMBA LIVIA*) RED BLOOD CELLS BY THE PESTE DES PETITS RUMINANTS (PPR) VIRUS

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ABSTRACT

A haemagglutination (HA) system was developed, for the first time, utilising red blood cells (RBC) from camels (*Camelus dromedarius*) and pigeons (*Columba livia*) with Peste des Petits Ruminants virus (PPRV). Chicken blood was also used. Pigeon RBCs showed the highest agglutination against the virus followed by camel and chicken RBCs.

For the diagnosis of PPRV the camel RBCs can be used satisfactorily, in places where camels are reared.

Key words : Camels and pigeons RBCs, haemagglutination test, PPR virus

Peste des Petits Ruminants virus (PPR) is an acute fatal disease of sheep, goats and some wild ruminants. It is caused by a *Morbillivirus* of the family *Paramyxoviridae* (Gibbs *et al*, 1979).

The virus has been reported to cause agglutination of RBCs of some avian and mammalian species (Wosu, 1985; Ramachandran *et al*, 1993; Ezeibe *et al*, 2004). However, the spectrum of animal RBCs that are able to interact with PPR virus is still to be exploited. The present study is one of these expansions.

Materials and Methods

Virus samples

The PPR viruses used in the study were as follows:

1. Tissue samples from naturally infected gazelles (Abu-Elzein *et al*, 2004). These were spleen, lung and liver.

2. Four samples of Vero cell culture passaged PPRV. These were field viruses isolated from Dorcas gazelles (*Gazella dorcas)* and Thomson's gazelles *(Gazella thomsoni)* (Abu-Elzein *et al*, 2004).

3. One spleen sample from experimentally infected sheep with the gazelle strain (Gaz/zn/Sau/02), (AL-Naeem *et al*, 2005).

The tissue samples were homogenised in phosphate buffered saline (PBS) pH 7.0 and centrifuged at 1500 r.p.m. for 15 minutes. The supernatants were collected, antibiotics added, aliquoted and stored at –86°C for use in subsequent experiments.

Red blood cells (RBC)

Whole blood was collected from dromedaries, chickens and pigeons, in ethylene diamine tetraacetic acid (EDTA) blood tubes. They were washed 3 times using PBS (pH 7.0) and centrifuged at 1500 r.p.m for 15 minutes. An RBC concentration of 0.6% in PBS was then made from each species as described by Wosu (1985).

Haemagglutination (HA)

Three temperatures and different incubation times were used for the HA test with the 3 types of RBCs. These were 4°C, 25°C (room temperature) and 37°C.

The HA test was conducted in 3 microtitre plates. Two-fold serial dilutions were performed on each sample in PBS using 0.05 ml for each microtitre plate well. Then 0.05 ml of RBCs were added to the respective set of plates.

Controls consisted of 0.6% RBCs alone. Each set of plates was then incubated at 3 different temperatures.

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Table 1. The HA activity of the PPR virus against the RBCs from camels, pigeons and chickens.

PPR Virus Samples	Camel	Pigeons	Chicken
Vero cell culture (1)	1:32	1:64	1:32
Vero cell culture (2)	1:32	1:64	1:32
Vero cell culture (3)	1:32	1:32	1:32
Vero cell culture (4)	1:32	1:64	1:32
Spleen Gazelle	1:256	1:128	1:128
Liver Gazelle	1:128	1:128	1:164
Lungs Gazelle	1:128	1:128	1:128
Spleen	1:256	1:512	1:12

Experimental sheep

Controls - = negative

For each temperature, the plates were examined for HA activity at 10 minutes intervals for one hour. Agglutination was completed when the RBCs in the control wells had settled as a button (Ezeibe *et al*, 2004). Failure of the RBCs to make a button in the wells was taken as positive HA activity.

Results

As seen in table 1 different level of HA activity were observed for the RBCs from each of the three species (camel, pigeon and chicken). The optimal incubation time for the three species was 25 min at both 4°C and room temperature. At 37°C results were inconsistent.

Pigeon RBCs showed the highest agglutination against the virus, followed by the camel and the chicken.

Discussion

In spite of the high level HA activity of camel and pigeon RBCs reported with some virus members of the family *Paramyxoviridae* (Abu-Elzein *et al*, 1993; Ballouh *et al*, 1985), the PPR virus, which is a member of the same family, was not tested with RBCs in these two species. The present study reports HA activity of chicken, pigeon and camel RBCs against the PPR virus.

Pigeon RBCs gave the best results followed by camel and chicken blood. Earlier reports (Eseibe *et al*, 2004) indicated that the best HA activity for PPRV was obtained with human type 'O' and chicken RBCs in comparison to RBCs from dogs, goats and pigs. Our results show that pigeon and camel RBCs can successfully be used to agglutinate PPRV.

In Saudi Arabia, RBCs from camels are readily available as camels are daily slaughtered as food animals. The use of camel, pigeon or chicken RBCs do not pose risk whereas human blood can be a health hazard when handled.

The HA is an easy test to perform and it gives rapid and satisfactory results. The HA can easily be standardised as a rapid and cheap test in countries where PPR is endemic using RBCs from diferrent animal species.

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References

Abu Elzein EME, Hassanein MM and Al-Afaleq AI (1993). High level agglutination of the camel (*Camelus dromedarius*) by pigeon paramyxovirus–1. Avian Pathology 22:189 -192.

Abu-Elzein, EME, Housawi FMT, Bashareek Y, Gameel AA, and Al-Afaleq (2004). Severe PPR infection in gazelles kept under semi-free range conditions. Journal of Veterinary Medicine Series B 5:68-71.

Al-Naeem A, Abu-Elzein EME, Abdelsalam EB, Al-Hizab A Housawi FMT and Al-Afaleq AI (2005). Experimentation with a virulent Gazelle PPR field virus in sheep and goats (In preparation)

Ballouh A, Abu-ELzein EME and El-Mubarak AK (1985). Outbreak of the pigeon paramyxovirus serotype-1 in the Sudan. The Veterinary Record 116:375-376.

Gibbs EPJ, Taylor WP, Lawman MJP and Bryant J(1979). Classification of peste des petits ruminants virus as the fourth member of the genus. Morbillivirus. Intervirology 11:268-274.

Ezeibe MCO, Wosu LO and Erumaka IG (2004). Standardisation of the haemagglutination test for peste des petits ruminants (PPR). Small Ruminant Research 51:269-272.

Ramachandran S, Hegde NR, Raghavan R, Subbarao MS and Shyam G (1993). Haemagglutination by PPR virus. In: Proceedings of the 3rd International Sheep Veterinary Conference, Edinburgh. pp 1-2.

Wosu LO (1985). Agglutination of red blood cells by PPR virus. Niger Veterinary Journal 14:54-58.