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Short communication

White and red blood cells picture in rabbits experimentally infected with RHD virus¹

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Abstract

Four strains of RHDV assigned as haemagglutinating (Vt97 and Hartmannsdorf) and non-haemagglutinating (Pv97 and 9905) antigenic variants were examined for dynamic changes in the values of white and red blood cells indexes. The study showed differences among strains examined that were not depending on haemagglutination property.

Key words: rabbit haemorrhagic disease, antigenic variant, haemagglutination

Introduction

Evaluation of haematological indexes during the course of rabbits' infection with RHD virus has proven that the haematological picture of the animals infected with different strains of RHDV differentiates the strains, however it is not sufficient to assign the virus into haemotypes (Tokarz-Deptuła 2009, Niedźwiedzka-Rystwej and Deptuła 2010). So far there is also no information about the haematological indexes of rabbits infected with non-haemagglutinating RHDV strains, or RHDV antigenic variants. It has been previously demonstrated that the mechanism of RHDV pathogenic effect on macroorganism is regulated by the haemagglutinating properties of the virus (Tokarz-Deptuła 2009, Niedźwiedzka-Rystwej and Deptuła 2010). Moreover, the RHDV antigenic variants cause not only a higher mortality rate in infected rabbits in comparison to the strains which are not classified as antigenic variants, but also they exhibit a different antibody-binding properties (Tokarz-Deptuła 2009, Niedźwiedzka-Rystwej and De-

ptuła 2010) which may be connected with the pathogenicity of the virus.

The aim of this study was to describe the dynamic changes in the values of white (WBC) and red blood cells (RBC) indexes, as an element of rabbits plague, and to evaluate the mortality of animals experimentally infected with haemagglutinating (Vt97 and Hartmannsdorf) and non-haemagglutinating (Pv97 and 9905) RHDV variants, which originate from Italy (Pv97 and Vt97), Germany (Hartmannsdorf), and France (9905).

Materials and Methods

For the purpose of this study, 80 mixed-breed rabbits of both sexes coming from a licensed breeding farm, being under a constant veterinary and zootechnique supervision (Annon 1987, 2006), were divided into 8 groups, each comprising 10 animals. There were 4 experimental groups in which rabbits were infected with one of the investigated RHDV strains: haema-

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gglutinating (Vt97 or Hartmannsdorf), and non-haemagglutinating (Pv97 or 9905), and 4 control groups, each corresponding to one of the experimental groups, according to the procedure described earlier (Niedźwiedzka-Rystwej and Deptuła 2010). Blood samples were collected from all groups of rabbits (control and experimental) from the peripheral vein of ear at a time point 0 – before RHD virus, or glycerol injections, and after 4, 8, 12, 24, 36 hours of the experiment. Additionally, mortality rate was registered. The obtained results of haematological analysis were subjected to statistical analyses by t-Student test with $p=0.05$, with the use of Statistica software ver. 6.0. Additionally, the mortality rate was presented as a percentage of death cases registered during the time of experiment.

Results and Discussion

Analysis of the haematological indexes in rabbits infected with RHDV showed that the investigated strains of the virus – haemagglutinating, or non-haemagglutinating – differ in regard to the analysed WBC and RBC indexes. Three out of four investigated variants: haemagglutinating strains Vt97 and Hartmannsdorf, and non-haemagglutinating strain 9905 caused only slight changes in these parameters, whereas the non-haemagglutinating RDHV variant (Pv97) evoked almost 10-fold changes, mainly in the number of lymphocytes, neutrophils, and thrombocytes. Similar differences between the investigated RDHV strains were observed in respect to the mortality rate, which oscillated between 30-100% depending on the viral strain.

The results of the up-to-date studies on the RHD virus infection are lacking information about the changes in haematological indexes caused by the different antigenic variants of RDHV. Some data can be found regarding 14 haemagglutinating strains originating from France (Fr-1, Fr-2) (Tokarz-Deptuła 2009), Czech Republic (CAMP V-351, CAMP V-561, CAMP V-562, CAMP V-558) (Hukowska-Szematowicz 2006) and Poland (K-1, SGM, MAŁ, KGM, ŻD, PD, GSK, Kr-1) (Piekarski 1994, Tokarz-Deptuła 2009), and one Polish non-haemagglutinating strain BLA (Tokarz-Deptuła 2009). However, the described strains are not classified as antigenic variants. These studies describe mainly a decline of investigated WBC parameters, especially in respect to the number of neutrophils, leucocytes, and lym-

phocytes, observed within 30-60 h after infection. The greatest changes in the haematological indexes were observed in the case of infection with CAMP V-351 strain, and the less pronounced effect was seen in animals infected with French Fr-1 strain (Hukowska-Szematowicz 2006, Tokarz-Deptuła 2009).

It should be mentioned that the studies on the picture of the haematological indexes during rabbits; infection with RDHV haemagglutinating strains, conducted worldwide, and concerning mainly the unclassified strains of this virus from the regions of China, Austria, Israel, Italy, Germany, Korea, Spain and France (quote Tokarz-Deptuła 2009, Niedźwiedzka-Rystwej and Deptuła 2010), showed that these strains cause, in most cases, a decrease in the WBC parameters, observed mainly 35-56-60 h after the infection, and sporadically within 4-8 h after administration of the virus. The changes concerned especially the number of neutrophils, lymphocytes, and the general number of leucocytes, which confirms the previous observations conducted in Poland (Piekarski 1994, Hukowska-Szematowicz 2006, Tokarz-Deptuła 2009).

References

- Annon (1987) Information and training materials of the Laboratory Animals Section, General Assembly of the Association of Agriculture Engineers and Technicians, In: Materiały informacyjno- szkoleniowe Sekcji ds. Zwierząt Laboratoryjnych ZG Stowarzyszenia Inżynierów i Techników Rolnictwa, Warsaw pp. 26-77 (in Polish).
- Annon (2006) Regulation of the Minister of Agriculture and Rural Development of 10 March 2006 on detailed conditions for maintenance of laboratory animals in experimental units, breeding units and suppliers (Polish Journal of Laws of 2006, No. 50, item 368), (in Polish).
- Hukowska-Szematowicz B (2006) Immunological-genetic characteristics of chosen strains of RHD (rabbit haemorrhagic disease) virus, Doctoral thesis, Szczecin, Poland (in Polish).
- Niedźwiedzka-Rystwej P, Deptuła W (2010) Non-specific immunity in rabbits infected with 10 strains of the rabbit haemorrhagic disease virus with different biological properties. *Centr Europ J Biol* 5: 613-632.
- Piekarski J (1994) The immunological and haematological picture and viral pathomorphogenesis and clinic investigations in rabbits experimentally infected with RHD (rabbit haemorrhagic disease) virus. Doctoral thesis, Olsztyn, Poland (in Polish).
- Tokarz-Deptuła B (2009) Immunity phenomena in rabbits infected with the RHD (rabbit haemorrhagic disease) virus. *Pol J Env Stud* 7: 1-81.