

Differences in hematological values of common carp between cardiac and venous blood

B. Bojarski*, E. Kondera, M. Witeska and K. Ługowska

Institute of Biology, Department of Animal Physiology, Siedlce University of Natural Sciences and Humanities, Prusa 14 Street, 08-110 Siedlce, Poland

Abstract

A comparison of hematological values between cardiac and venous blood of common carp juveniles was performed. The results showed that hematocrit, hemoglobin concentration and erythrocyte count were higher in venous samples compared to cardiac, while other parameters (mean cell volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, erythroblast and abnormal erythrocyte frequency, leukocyte and thrombocyte count, percentage of lymphocytes and neutrophils) did not significantly differ. We hypothesise that the differences resulted from hemoconcentration of venous blood due to fluid loss in microcirculation compared to the cardiac blood diluted with fluid returned via secondary vascular system or SVS might have sequestered erythrocytes from blood circulation.

Introduction

Hematological tests are often used in research concerning the effects of various environmental factors on fish since they provide information about the physiological status of an organism (e.g. Kreutz et al., 2011; Lutnicka et al., 2016). Evaluation and comparison of hematological data in fish is, however, difficult because of the lack of generally accepted reference values for this group of animals since hematological parameters in fish are strongly affected by seasonal factors (Collazos et al., 1998). The values of hematological indices may also differ due to different methods of blood collection, processing and analysis applied by various authors. The results of hematological measurements in fish may be significantly affected by anesthetics (Witeska et al., 2015), anticoagulants (Walencik and Witeska, 2007; Maqbool et al., 2014) and

time of blood storage (Faggio et al., 2013). Fish blood is routinely taken from the caudal vein by puncture (Svobodova et al., 1991; Kreutz et al., 2011) or – in case of very small fish – by severing the caudal peduncle (Satyanarayan et al., 2004), directly from the heart by puncture through the skin (Witeska et al., 2010) or using a glass capillary tube through the gills (Lutnicka et al., 2016). An appropriate amount of blood is important to obtain reliable results. The maximum amount of blood that can be safely obtained from healthy fish is 30 to 50% of total blood volume (Groff and Zinkl, 1999). Also the speed of blood collection may considerably affect its usefulness for analyses and their results since sampling itself is stressful for fish and stress may accelerate blood coagulation (Casillas and Smith, 1997; Ruis and Bayne, 1997). The aim of this study was to compare hematological values of common

* Corresponding author's email: bbojarski@o2.pl