



Cytomorphological studies on granulocytes of pig

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Abstract : The neutrophils were round in shape and 12.00 ± 0.44 mm in size. The nucleus possessed lobes with variable size, shape and number. The pale gray cytoplasm of neutrophils was laden with light pinkish fine granules which were uniformly distributed. The eosinophils were round in shape and were 12.25 ± 0.28 mm in size. The nuclei had 2-4 lobes and connected with thick chromatin strands. The cytoplasmic granules were round, numerous, densely packed, strongly eosinophilic and uniformly distributed throughout the cytoplasm. The basophils were roughly round in shape and 13.25 ± 0.24 mm in size. The nuclei had 2-3 lobes which were connected with comparatively thicker chromatin strand. The cytoplasm had numerous basophilic granules occupying whole of the cytoplasm. The erythrocytes of pig were non nucleated, biconcave shaped and 5.7 ± 0.17 mm in size. The platelets were irregular in shape and 2.76 ± 0.33 mm in size.

Key words : Cytological, Neutrophils, Eosinophils, Basophils

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INTRODUCTION

The blood is the major tool in the hands of veterinary practitioners. The blood examination is performed routinely to assess general health and diagnosis of various pathological conditions on domestic animals the reports on granulocytes, erythrocytes and platelets of pig are meagre.

The cytomorphological studies on blood cells have been documented in camel (Singh *et al.*, 1997), buffalo calves (Singh, 2000), goat (Menaka and Singh 2006), black bear (Salakij *et al.*, 2005) and macaque (Sakulwira *et al.*, 2008). In spite of large quantum of literature available on domestic animals the literature on pig is meagerly available (Coles, 1980 and Venn, 1944). Hence the present study was conducted.

RESEARCH METHODOLOGY

The study was conducted on ten apparently healthy Large White Yorkshire pigs of 1-2 years of age, maintained at livestock production and management farm of College of Veterinary Sciences, G.B. Pant University of Agriculture and Technology, Pantnagar. The blood samples were collected

from ear vein of pig and transferred to test tubes containing EDTA as an anticoagulant. The smears were prepared immediately on grease free slides. The blood films were stained with the May Grunwald Giemsa stain for general cytomorphological studies (Bover, 1964). The stained blood smears were examined under oil immersion objective (100X) lens to record the results. The filor micrometer was used to record the dimension of different cells and the mean value with standard error of all the measurement of the cells were expressed.

RESULTS AND DISCUSSION

The neutrophils were round in shape and 12.00 ± 0.44 mm in size. The nucleus possessed lobes with variable size, shape and number. The size and arrangement of lobes varied greatly. The arrangement of nuclear segments were ring, spiral, U, S, Z, M and 8. The number of lobes varied from 2 to 5. Chromatin material inside the nuclear lobe was distributed in the form of light and dark patches. Generally the darkly stained patches were placed centrally. The pale gray cytoplasm of neutrophil was laden with light pinkish fine granules which

were uniformly distributed when stained with MGG (Fig.1). Patil *et al.* (1992) reported that the neutrophils in buffalo were 10.93 ± 0.28 mm in diameter. Jain (1986) observed that mature neutrophils of cattle ranged in size from 10-15 mm and their average size was about 11.5 mm. Singh (2000) observed in buffalo calves that the neutrophils were round in shape and measured 13.25 ± 0.77 mm. Menaka and Singh (2006) observed that goat neutrophils were round in shape and measured 10.16 ± 0.76 mm. Sakulwira *et al.* (2008) reported that in macaques the average diameter of neutrophils were $12.0 \pm 1.3 \mu\text{m}$. The pale gray cytoplasm of neutrophils was laden with light pinkish fine granules which were uniformly distributed when stained with MGG, as stated by Singh *et al.* (1997) in camel, Salakij *et al.* (2005) in asiatic black bear and Prihirunkit *et al.* (2007) in fishing cat.

The eosinophils were round in shape and 12.25 ± 0.28 mm in size. The nuclei had 2-4 lobes and connected with

comparatively thick chromatin strands than that of neutrophils. The size and arrangement of lobes varied greatly. The darkly stained, chromatin materials were mostly distributed in the central area. The cytoplasm was comparatively darkly stained. The cytoplasmic granules were round, numerous, densely packed, uniformly distributed throughout the cytoplasm and strongly eosinophilic when stained with MGG (Fig. 2). Archer *et al.* (1977) observed that in all domestic animals diameter of eosinophils were 12 mm. Jain (1986) reported that average size of bovine eosinophil was 12-13 mm and some cells attained a diameter of 15 mm. Patil *et al.* (1992) pointed 12.11 ± 0.38 mm sized eosinophils in buffalo. Brown (1987) reported that eosinophils of all domestic animals were 10-15 mm in diameter. Singh *et al.* (1997a) noticed that the eosinophils in camel were large and oval in shape and average size was 13.58 ± 1.218 mm. Singh (2000) found that the eosinophils were large in buffalo

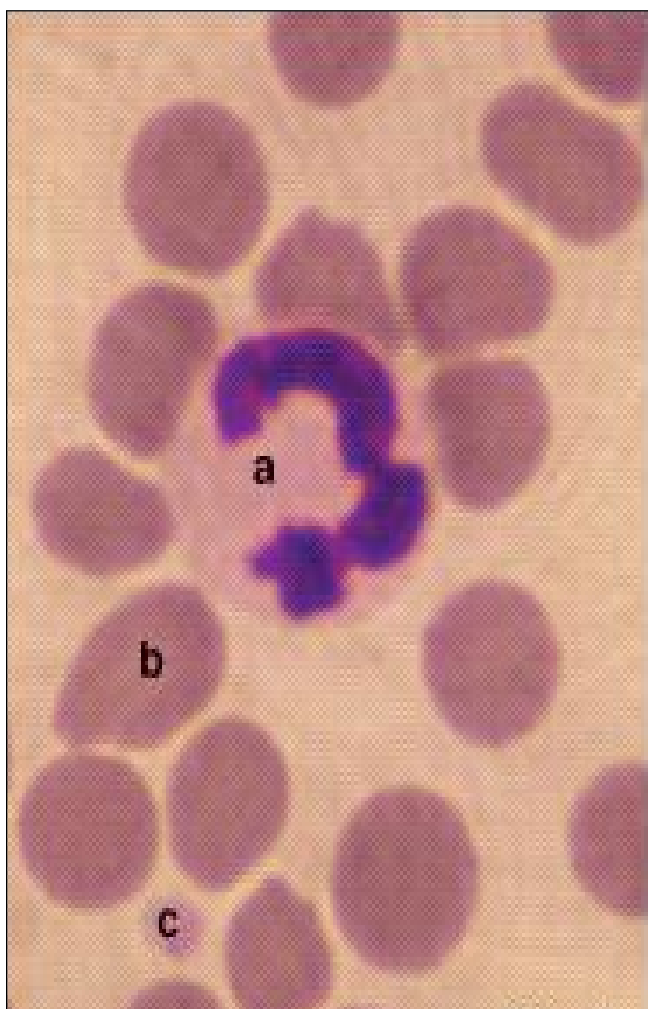


Fig. 1 : Photomicrograph of blood smear showing neutrophil (a), erythrocytes (b) and blood platelet (c). May Grunwald Giemsa stain X 1000

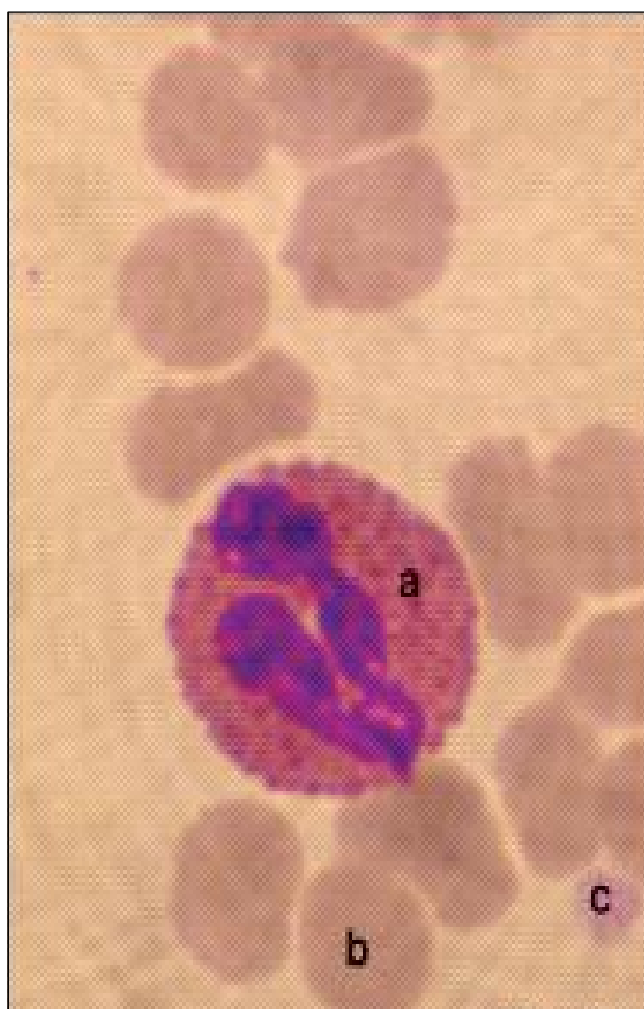


Fig. 2 : Photomicrograph of blood smear showing eosinophil (a), erythrocytes (b) and blood platelet (c). May Grunwald Giemsa stain X 1000

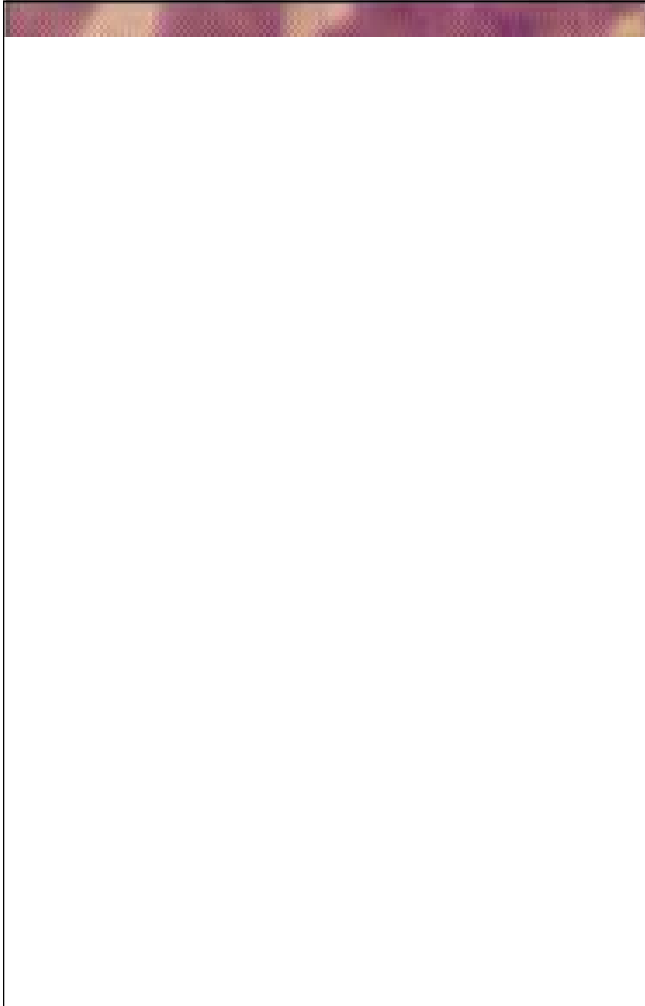


Fig. 3 : Photomicrograph of blood smear showing basophil (a) and erythrocytes (b). May Grunwald Giemsa stain X 1000

calves and measured 14.25 ± 0.37 mm. Salakij *et al.* (2005) observed in black bear that the average diameter of eosinophils varied from 10 to 16 μm . Menaka and Singh (2006) reported that goat eosinophils were large, round in shape and measured 13.60 ± 1.25 mm. Pothiwong *et al.* (2006) noticed that the basophils of felis and panthera spp. were 9-18 μm in diameter. The cytoplasmic granules were round, numerous, densely packed, strongly eosinophilic and uniformly distributed throughout the cytoplasm as reported by Dellmann and Eurell (1998) in sheep, goat, cows and pigs. Eurell and Frappier (2006) in cow (Singh, 1993) and Menaka and Singh (2006) in goat.

The basophils were roughly round in shape and 13.25 ± 0.24 mm in size. The basophil was the largest cell among leukocytes in pig. The nuclei had 2-3 lobes which were connected with comparatively thicker chromatin strand. The nucleus was generally indented and placed eccentrically. The cytoplasm had numerous basophilic granules occupying

whole of the cytoplasm (Fig. 3). Jain (1986) reported that bovine basophils varied in size from 11-14 mm. Patil *et al.* (1992) reported that the basophils in buffalo had average diameter of 13.79 ± 0.0 mm. Singh *et al.* (1997) stated that the basophils in camel were spherical and 11.557 ± 0.683 mm in size. Singh (2000) stated that the basophils in buffalo calves were spherical in shape and 14.12 ± 0.69 mm in size. Salakij *et al.* (2005) noticed that average diameter of basophil in black bear was 12 μm . Eurell and Frappier (2006) stated that basophils in dog measure 10 to 15 mm in size. Menaka and Singh (2006) observed that basophils of goat were round in shape and were 13.05 ± 2.09 mm in size. Pothiwong *et al.* (2006) noticed that the basophils of felis and panthera spp. were 9-18 μm in diameter. Sakulwira *et al.* (2008) observed that basophils of macaque had diameter of $11.5 \pm 1.5 \mu\text{m}$. The cytoplasm had numerous basophilic granules occupying whole of the cytoplasm as described by Feldman (2000) in sheep, cattle and goat, Salakij *et al.* (2005) in black bear, Huda *et al.* (2000) in Camels, sheep and goats and Prihirunkit *et al.* (2007) in fishing cat. Jain (1993) stated that canine basophils had larger and fewer granules than bovine and equine.

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