

# Description Of Local Pigs Histopathology in Small Islands of North Sulawesi

Mege Revolson Alexius<sup>1,2</sup>, Montolalu Friska Mery<sup>3</sup>, Rumondor Rolef<sup>4</sup>, Manampiring Nonny<sup>1</sup>

<sup>1</sup>Departement of Biology, Faculty of Matehematics and Natural Science, Manado State University, Indonesia

<sup>2</sup>Professor of animal physiology, Departement of Biology, Faculty of Matehematics and Natural Science, Manado State University, Indonesia

<sup>3</sup>Departement of Pharmacology, Faculty of Matehematics and Natural Science, Christian University of Indonesia Tomohon, Indonesia

<sup>4</sup>Departement of Pharmacology, Faculty of Health Sciences, Trinita University, Indonesia

\*Coressponding author e-mail: [ramege@unima.ac.id](mailto:ramege@unima.ac.id)

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## Abstract

Some areas in Indonesia have local pigs with their own special characteristics. One of them is North Sulawesi which has local pigs that are maintained by the population with a traditional system and some live wild. The liver is the largest gland that has an important function for living things. This study aims to determine the histology of native pig liver from small islands in North Sulawesi. The liver is histopathologically processed with hematoxylin-eosin staining and then the preparation is analyzed descriptively. The results showed a histological picture in the Buhias and Bunaken areas showing necrosis and widening of the sinusoid while histological features in the Kahuku, Bangka and Nain regions showed that the liver had severe steotasis and cirrhosis of the liver.

**Key words:** local pigs, histopathology, liver, North Sulawesi

## 1. INTRODUCTION

The population of pigs in Indonesia is concentrated in several areas including Bali, Sumatra, Java, East Nusa Tenggara (NTT), Sulawesi, Kalimantan, and Papua. Some of these areas also have local pigs with their specific characteristics. Indonesia has five pig species out of eight species in the world (Rothschild *et al.* 2011). One of them is North Sulawesi which has local pigs that are maintained by the population with a traditional system and some live wild. Pigs are monogastric and omnivorous animals or eat everything (Supriadi, 2014). Local pigs are animals that have been domesticated for a long time and have a high adaptation to the local environment.

The decline in population of several local pigs is thought to continue to occur, among others, the Javanese Berkutil (*Sus verrucosus*), Kalimantan pigs (*Sus barbatus*), Sulawesi pigs (*Sus celebensis*) and Babirusa (*Babyroussa babyrousa*) as a result of poaching carried out by poachers. The destruction of local pigs has occurred in Kalimantan pigs, according to Oliver & Leus (2008); Semiadi *et al.* (2008); and Hastiti (2011) the population is in the vulnerable to endangered stage which is almost threatened to be destroyed. In addition to the problem of extinction, the problem faced in its development is the lack of information that can be used as important information for the development process due to lack of research on local pigs, including lack of research on organs in the bodies of local pigs.

The liver is an organ that acts as a detoxification, the liver is the largest gland that has an important function for living things. The liver has functions including secreting bile, fat metabolism, and detoxification of various drugs and poisons (Irgantara, 2015). Microscopically the liver consists of hepatocyte cells and lobules, which include sinusoids, central veins, cells, buffer cells, hepatic arteries, portal veins, biliary ducts, and some connective tissue that connects lobules in the liver (Baqarizky, 2015). The function of the liver that is no less important is to protect the accumulation of harmful substances and poisons that enter from outside the body (Manatardkk, 2013). Because of its very strategic location and multi-dimensional function, and the limitations of the liver's detoxification function, it is very vulnerable to disease. The liver will respond to various diseases by inflammation, called hepatitis (Sebastiana, 2009). If hepatotoxic substances exceed their physiological limits, pathophysiological conditions will occur, including due to harmful substances in food that enter the body.

The liver has a very important function so that if there is a disturbance in the function of the liver it will directly affect other bodily functions. Disorders of the liver can be divided into four categories, each with its own reaction patterns such as disorders of the bile system, circulatory disorders, parenchymal disorders and neoplastic disorders (Dijkdkk, 2007). The purpose of this study was to determine the histology of local pig liver from small islands in North Sulawesi.

## 2. METODE

This study uses liver samples from local pigs taken from small islands in Sulawesi. The liver is removed, cleaned from the surrounding tissue then fixed with Bouin solution. Subsequently embedding in paraffin, cut to a thickness of 5u and stained with hematoxylin-eosin (H-E) to see liver histopathology in local pigs from small islands in North Sulawesi (Humason, 1967; Shah, *et al.*, 2011). Local pigs liver taken is made in histological preparations.

The liver that has been taken is washed with physiological HCL solution and fixed with Bouin for 24 hours. The liver is cut into small pieces and dehydrated in a series of alcoholic solutions with multilevel concentrations, from dilute to concentrated (70% to 100%). Furthermore, it was clarified with xylol for 6 hours. After the purification process is carried out embedding with paraffin which has been thawed at 58 - 60 °C for 6 hours. The paraffin block is cut serially at a thickness of 5 µm with a microtome. The piece is placed in warm water and transferred to a glass slide. The preparations on the glass slide are stained with the Hematoxylin-Eosin staining technique. The coloring process is carried out after the paraffin is removed with xylol. Furthermore, the xylol can be cleaned with filter paper. The preparations were dipped into 100% alcohol, 95%, 90%, 80%, & 0%, distilled water, and put in Hematoxislin for 5 minutes. The next process is the preparation washed with running water for 10 minutes and the preparation is dipped in succession into distilled water, then put in eosin Y in 70% alcohol for 5 minutes. After that, the preparations were dipped in 70%, 80%, 90%, 95%, 100% alcohol and then dried between filter paper and put into xylol for 10 minutes. The dosage is dropped with entel, then covered with glass cover and labeled. Data from the histological examination of the liver were analyzed descriptively.

### 3. RESULTS AND DISCUSSION

Based on observations on the microscopic picture of local pig liver originating from Buhias (Figure 1) experiencing hepatocyte cell necrosis.

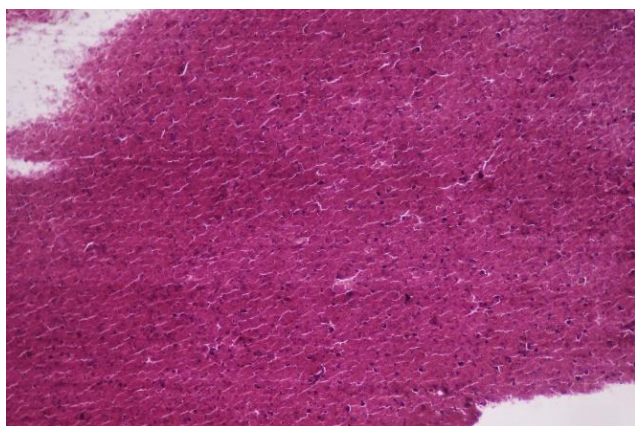


Figure 1. Microscopic depiction of local pig liver from Buhias Island

Based on observations on microscopic images of native pigs liver that emerge from buhias (Figure 2) experience hepatocyte cell necrosis and sinusoidal dilation.

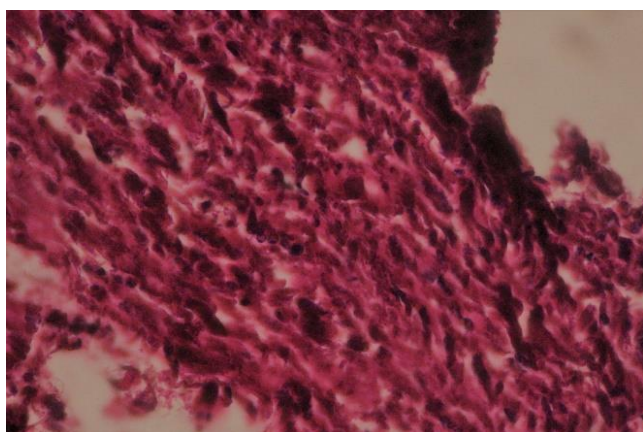


Figure 2. Microscopic depiction of pig liver from Bunaken Island

Necrosis is a pathological cell death from body tissues in living animals. According to Ressang (1984) necrosis in the liver can be divided into causatocsipatic and causatrophopathic. Toxopathic damage occurs because of toxic agents such as chemicals or toxins caused by germs while trophatic damage occurs due to lack of cell-living substances such as oxygen and nutrients.

Cell death shows a black core (Piknotis). Piknotis is condensation of chromatin material so that the nucleus shows a darker and smaller color. Necrosis that occurs is thought to be caused by food poisoning. Food poisoning can occur due to the location of pigs near the settlement.

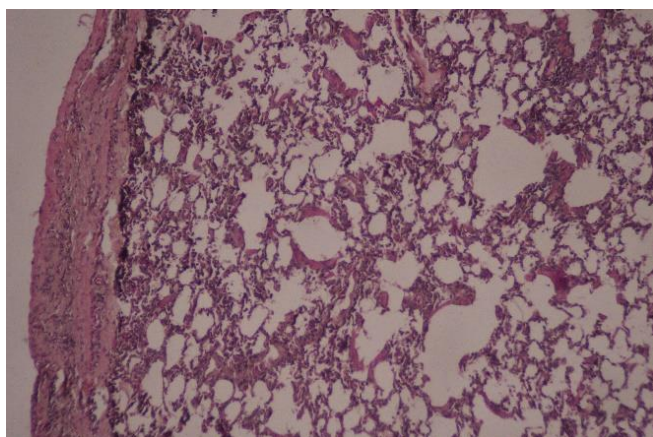


Figure 3. Microscopic depiction of pig liver from the island of Kahuku Bangka

Microscopic observations of local pig liver from Bangka's kahuku have severe steatosis, necrosis and inflammation cells and an increase in connective tissue (Figure 3), when sampling the condition of pigs in fat and when sampling liver conditions filled with fat.

Microscopic observations of local pig liver from Bangka's kahuku have severe steatosis, necrosis and inflammation cells (Figure 4)

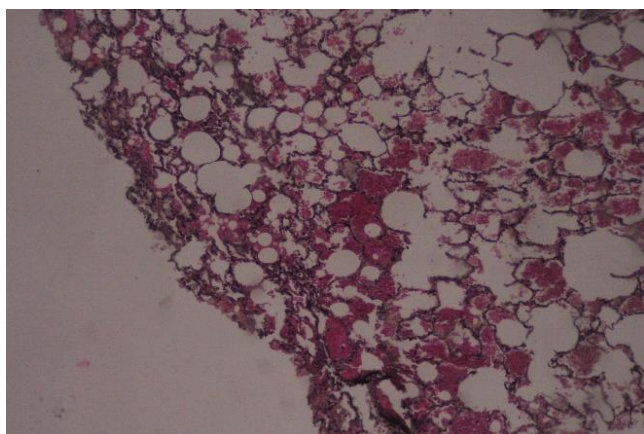


Figure 4. Microscopic depiction of pig liver from the island of Nain

Steatosis or fatty liver is caused by accumulation of triglycerides in the liver. Triglycerides are formed by free fatty acids from food or peripheral lipolysis. Fatty degeneration or steatosis is an abnormal accumulation of triglycerides in parenchymal cells. The causes of steatosis are toxin, protein malnutrition, diabetes mellitus, obesity and anoxia.

The presence of insulin resistance increases lipolysis, so more fatty acids are transported to the liver. When there is damage to the liver cells, there is inflammation mediated by various cytokines.



Steatosis can be followed by perisinusoidal fibrosis, which can then spread and become cirrhosis. (Nurman, A, *et al.*, 2007) In addition, microscopic observations of the liver in Figure 3 and Figure 4 show that the liver has cirrhosis. Cirrhosis is caused by various causes, causing chronic liver damage (Ressang, 1984). Liver damage causes hardening of the liver due to loss of parenchyma which is followed by an increase in connective tissue. Increased connective tissue and regeneration cause the structure of the liver to change.

Ressang (1998) states that the liver plays an important role in the body because it has several functions, namely as bile secretion, fat metabolism, protein and iron metabolism, produce bile, detoxification function, red blood formation, metabolism and vitamin storage. The liver can detoxify properly when in good health.

#### 4. CONCLUSION

This study showed a histological picture of a local pig liver organ sample from Buhias and Bunaken showing necrosis and widening of the sinusoid, while a histological picture of a local pig liver sample from the Kahuku, Bangka and Nain regions showed that the liver had severe steatosis and liver cirrhosis.

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