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NORMAL AEROBIC VAGINAL BACTERIAL FLORA OF THE AFRICAN GIANT RATS (AGR) CAPTURED FROM THEIR NATURAL HABITAT IN ABEOKUTA, OGUN STATE, NIGERIA.

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ABSTRACT

The genital tract of female animals, especially the caudal region, is known to habour non specific bacteria that are sometimes called the normal bacterial flora. In this study, we examined 12 apparently healthy female African giant rats (*Cricetomys gambianus,* Waterhouse) (AGR) to determine their vaginal bacterial flora. Swab collected from the vagina of each rat after previous chloroform anaesthesia was seeded onto blood and MacConkey agar plates and incubated aerobically at 37^0C for up to 48hours. Isolates were then characterized using various character parameters. The results indicated that 7 bacterial genera inhabit the vagina of the 12 African giant rats that were studied. The distribution of the bacteria species in the AGR were highlighted in the text. It is inferred from the results that under stress condition, these bacteria could cause disease in the African giant rats.

Keywords: African giant rat, bacteria, vagina, Abeokuta.

INTRODUCTION

The African giant rat, also known as pouched rat is one of Africa's largest rodents. Two species have been distinguished: *Cricetomys gambianus*, which lives chiefly in Savannahs and around the regions of forests and human settlements; and *Cricetomys emini,* which is mostly found in the rain forests. They are found in Central Africa and in regions south of the Sahara desert which includes Nigeria (Ajayi and Tewe, 1978). Being natural inhabitants of sub-Saharan Africa, these rodents are well suited to the climate and resistant to many endemic diseases prevalent in this region. Also, they serve as a source of animal protein in this region (Chineme and Ibrahim, 1984). With the World Health Organisation (WHO) directive on total minimal animal protein to be consumed daily, the African giant rat is becoming a well known source of animal protein and as delicacy to many (Asibey, 1978). In the indigenous African population, these rats are considered a delicacy and are often hunted for food.

The increasing drive to further understand the domestication and clinical management of these rodents has led to various biomedical and anatomical researches on the African giant rat with a focus on

domestication and food/protein security (Ajayi, 1971). Recent research has also employed keen sense of smell and the relatively light weight of this rodent in the areas of tuberculosis research and landmine detection (Nowak, 1997). Mamman *et al.,* (2007) carried out preliminary investigations of bacterial flora in the internal organs. Aside this, there is paucity of information on bacterial organisms either beneficial or pathogenic to this important rodent. This study seeks to find out bacterial organisms haboured as normal flora of the vagina of apparently healthy AGR.

MATERIALS AND METHODS

Study Location

This study was carried out at the University of Agriculture, Abeokuta, Nigeria (Latitude 7^0 5.5^1 – 3^0 2^1 and Longitude 3^0 11.2^1 – 3^0 2.5^1 and altitude 76 MASL) is situated in the rain forest vegetation zone. The area has a humid climate with mean annual rainfall and temperature of 1037 mm and 34.7^{0}C respectively and average relative humidity of 82% (Dipeolu *et al*., 2005).

Animals

Twelve apparently healthy adult African giant rats weighing 2-2.5kg were obtained from their natural habitat in Abeokuta, Ogun state, Nigeria. Prior to their use, all giant rats were housed individually for about one week in stainless steel cages at a room temperature of 27°C-32°C with about 12 hours of light per day. The animals were fed commercial rabbit diet (Ladokun Feed, Ibadan, Nigeria) and water ad libitum.

Samples

Each African giant rat was anaesthetized by chloroform inhalation. Vagina specimen was then taken with a sterile swab stick and then stored in sealed containers on wet ice (4^0C) until taken to the laboratory for bacteriological analysis.

Bacteriological Analysis

Primary isolation was done by directly streaking each swab onto 5% sheep blood and MacConkey agar (Oxoid, Basingstoke, U.K) plates .The plates were incubated aerobically at 37°C for up to 48 hours. Following the incubation period, the bacteria colonies were examined with hand lens, Gram stained and observed under oil immersion objective (X100) of binocular microscope (Olympus, Germany). Tests for catalase and oxidase activities, Motility, Indole production, triple sugar iron (TSI) reaction, Citrate, Lysine decarboxylase, Urea hydrolysis, Methyl red and Voges Proskauer were carried out according to the techniques described by Quinn *et al.* (1994) and Koneman *et al.*(2001).

The cell and colour morphology and the biochemical properties of bacteria described by Quinn *et al.* (1994) and Koneman *et al.* (2001) were used for the identification of the isolates from the AGR.

RESULTS

All cultured plates yielded growth and the isolates were distributed among seven genera of bacteria (Table 1).The most common isolate was *Staphylococcus aureus,* which occurred in about 21.7% of AGR that were studied (Table 2). This was closely followed by *E. coli* which occurred in about 19.6% of the AGR that were studied. Others include non-coagulating *Staphylococcus spp.* and *Proteus spp.* which occurred in about 13.0% each of the studied AGR. β- Streptococcus, Micrococcus spp. and Pseudomonas spp. accounted for 12.2% each (Table 2).

Table 1: Bacteria species isolated from the vagina of 12 African giant rats

Sample No.	*Staphylococcus aureus*	*Non-coagulase Staphylococcus ssp.*	*Micrococcus Sp.*	*Escherichia coli*	*Pseudomonas sp.*	*Proteus sp.*	*β-Streptococcus sp.*
1	+	+	+	-	-	-	-
2	+	-	-	+	+	-	-
3	+	-	-	+	-	+	-
4	-	+	+	+	-	+	+
5	+	+	-	+	-	-	+
6	+	-	-	+	+	+	-
7	+	-	+	+	+	-	+
8	+	+	+	-	+	+	-
9	-	+	-	+	-	+	-
10	+	+	+	+	+	+	-
11	+	-	-	-	-	-	+
12	+	-	-	+	-	-	+
Positive AGR	10/12	6/12	5/12	9/12	5/12	6/12	5/12

Key:
+ = Positive
- = Negative

Table 2: Incidence of different bacteria species isolated from the vagina of 12 African giant rats

S/N	Isolated Bacteria	No. of AGR carrying bacteria	% of AGR carrying the bacteria
1	*Staphylococcus aureus*	10	21.7
2	*Non-coagulase Staphylococcus sp.*	6	13.0
3	*Micrococcus sp.*	5	10.9
4	*Escherichia coli*	9	19.6
5	*Pseudomonas sp.*	5	10.9
6	*Proteus sp.*	6	13.0
7	*β-Streptococcus*	5	10.9
	Total isolates from samples	41	100

DISCUSSION

Unlike in many other animal species which are known to support verse important genital tract mucosal microflora, very few bacteria genera were isolated from the African giant rat genital mucosal surfaces. The predominant bacteria in the African giant rat vaginal were *Staphylococcus aureus* (21.7%) and *E. coli* (19.6%). Others include coagulase negative *Staphylococcus sp.*, *Proteus sp.* (13%) and *Micrococcus sp*, *Pseudomonas sp.* and β-haemolytic Streptococcus (10.9%).

Although lower in incidence in AGR, *Micrococcus sp.* has been reported in dog and rat vagina microflora (Larsen *et al.*, 1976 and Baba *et al.*, 1983). Also, the relative high incidence (Table 2) of *Staphylococcus aureus* in AGR vagina observed in this study was similar to previous observations of the vaginal flora of humans and dogs (Bartlett and Polk, 1984 and Chow *et al.*, 1984).

The isolation of *Streptococci* in the vagina of AGR in this study agrees with several earlier reports from other similar studies in which this organism was observed in many vaginal microfloras of different species (Scott *et al.*, 1971; Skangalis *et al.*, 1979; Baba *et al.*, 1983).

The number of AGR carrying members of Enterobacteriaceae (*E. coli* and *Proteus sp.*) (Table 2) in their vagina isolated suggests possible faecal contamination from the breeding environment, since these rodents spend most of their time in small confinements and are gregarious in nature.

Most of the isolated microorganisms are opportunist pathogens and can become a problem in periods of high stress levels. The African giant rats are very sensitive to stress and, under such condition, these bacteria present in their vaginal compartment can break the mucosa barrier leading to disease and environmental shedding (Huchzermeye, 2002).

The presence of these isolates organisms (Table 1) suggests that AGR could serve as reservoir hosts and potential sources of spread to other animals. Also, their meat and meat products could serve as sources of zoonotic transmission, especially during handling and consumption of improperly cooked meat from these animals.

In conclusion, there are seven varieties of aerobic bacteria isolated from the vaginal mucosa of the African giant rats that were studied. These bacteria can eventually be involved in pathological processes of these rodents and others, including humans.

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