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Immunohistochemical analysis of smooth muscle cells and volumetric density of the elastic system fibers of wild boar (*Sus scrofa*) penis

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Abstract

The purpose of the present study was to verify the smooth muscle cell distribution and elastic system fibers volumetric density (V_v) in the corpus spongiosum and corpus cavernosum of the wild boar penis. Adult wild boars (n = 13) were used. The penile mid shaft fragments were fixed with 4% phosphate buffered formalin solution and/or Bouin's liquid during 24–48 h, and processed using standard histological techniques. The sections were stained with Weigert's Resorcin-Fucsin with previous oxidation. The elastic system fibers V_v was determined in 25 random fields of each fragment using M42 test system. For immunohistochemical analysis, monoclonal anti-α actin smooth muscle was used. The histochemical methods detected elastic system fibers in both corpus spongiosum and corpus cavernosum of all animals. The elastic fibers V_v average was 36.6% ± 0.9 for corpus spongiosum and 11.7% ± 0.5 for corpus cavernosum. Through immunocitochemistry, a small quantity of smooth muscle cells was visualized in intimate relationship with blood vessels wall. The great amount

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of elastic fibers and the smooth muscle cell distribution beneath the endothelium suggest that these fibers may have an important role in penile erection process in the penis of wild boars.

Keywords: Penis; Wild boar; Elastic fibers; Stereology; Immunohistochemistry; Smooth muscle cells

1. Introduction

The general understanding of the morphological changes and physiology of penile erection is obtained through several studies considering different animal models (Pinheiro et al., 2000; Yesilli et al., 2001; Hellstrom, 2001; Burnett, 2001) such as rats (Pinheiro et al., 2000; Giuliano, 2000; Lee et al., 2002), domestic animals, primates (Paick et al., 1992; Hellstrom et al., 1994; Hellstrom, 2001; Bischoff, 2001), and rabbits (Qiu et al., 2000; Yesilli et al., 2001).

Morphological and quantitative data concerning wild boar are still scarce, and there is need for more information, mainly because these animals are used as biological models and commercially as potential protein sources (Swindle et al., 1988).

The wild boar (controlled by Environment Brazilian Institute) is a representative ancestor of domestic swine, being considered the same species *Sus scrofa* (Nickel et al., 1979; Nowak and Paradiso, 1983) because mating of domestic swine female with a wild boar produces fertile descendents. In China, since 4900 B.C. wild boars were maintained as domestic animals and after succeeding generations, domestication of swine occurred (Nickel et al., 1979).

Although the gross anatomy of wild and domestic swine is different, histological structural elements are similar in mammals, but with special characteristics for each species (Banks, 1992).

Elastic and collagen fibers are important penile constituents and maintain the penile structure during erection, and allow adequate resistance during the return to the non-erect state (Hsu et al., 1994; Sattar et al., 1994; Da Silva and Sampaio, 2002; Bastos et al., 2004).

The scientific literature, in general, focuses on the general morphology of the wild boar penis (Nickel et al., 1979). There is, however, no information about qualitative or quantitative connective tissue elements. The purpose of the present study is to gain a greater understanding of the wild board penis using immunohistochemical methods and morphometrical analysis of the elastic fibers in the corpus spongiosum and corpus cavernosum.

2. Material and methods

The ethical committee of the State University of Rio de Janeiro approved the research protocol. Adult wild boars (n = 13, Javali in Brazil) were obtained from a commercial farm (Profauna Limited), and slaughtered when weighing from 40 to 50 kg. After sacrificed, the penis was removed and immediately fixed in 4% phosphate buffered formalin solution and/or Bouin's liquid for 24–48 h. Afterwards, penile mid shaft segments were processed according to the standard histological techniques for paraffin embedding.