THE ROLE OF VIBRISSAE IN BEHAVIOR: A STATUS REVIEW

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ABSTRACT


Vibrissae or tactile hairs are an important part of the tactile sensory apparatus of many mammals. A wide range of suggested functions found in the literature include food acquisition, prey attack, aggression and attack behavior, facial expression in intraspecies communications, dispersion of pheromones, maintaining head position in swimming, and a wide range of environmental monitoring (e.g., current detection in water, wind direction on land). There is little work done specifically on domestic animals or their feral relatives. Work on the tactile senses in general and vibrissae in particular is an open field of study. A set of general questions for study of vibrissa function in domestic animals is presented.

INTRODUCTION

One of the more striking facial features of mammals is the presence of vibrissae or whiskers or tactile hairs (term preferred by the Nomina Anatomica Veterinaria, 1983). In fact vibrissae (term preferred by most authors) are found in almost all mammals except Homo sapiens; some other mammals may lack external vibrissae as adults but develop them pre-natally only to lose them before birth (Cave, 1969). The term vibrissa comes from the Latin "vibrio," meaning to vibrate, an appropriate name for these facial hairs, for at least in some rodents, they vibrate with exquisite regularity and consistency. The universality of vibrissae and the marvelous variety and array in which they appear suggest that they are important in the life of the animal (Pocock, 1914). Studies on marsupials (Lyne, 1959) and on carpal vibrissae (Beddard, 1902) point to the great variation among species while that within species is low (Dun and Fraser, 1959). There have been numerous suggestions through the years that this variation has adaptive significance; the question is not whether vibrissae are important in animal behavior, but how they function and what behaviors are involved. A study of anatomy and physiology as well as direct observations on vibrissae are important aids in suggesting hypotheses regarding their function. The present review should familiarize the reader with the major aspects of vibrissal biology and their role in behavior.
DESCRIPTION AND OCCURRENCE

Vibrissae as hairy outgrowths of the skin are a character unique to mammals, and are distinct from pelage hair in several major ways: (1) they are much longer than pelage hairs; (2) they may be localized to the facial region, though in many species they also occur on the forearm and/or the ventral body surface; (3) the follicles from which the vibrissae grow are extremely large and highly innervated compared to follicles of pelage hairs, (4) the vibrissae follicles possess blood-filled sinus tissues; (5) each vibrissae follicle is represented in the sensory cortex of the brain in a very precise way.

The vibrissae have been grouped and named in a variety of ways by different authors so that the terminology in the literature is not standardized. For example, some authors will include the rhinal vibrissae when discussing the mystacial ones while others do not. A persuasive case can be made for distinguishing among mystacial vibrissae on the basis of their embryological deviation and developmental patterns (Yamakado and Yohro, 1979). The nomenclature given in Nomina Anatomica Veterinaria (1983) is not complete enough to describe the variations of vibrissae found in mammals. The classification suggested below is based on the location of vibrissae, either Facial or Body. The tactile hairs of the mystacialum (the upper lip) are called primary vibrissae; all others whether on face or body are known as secondary vibrissae (Pocock, 1914; Lyne, 1959; Davidson and Hardy, 1952).

Facial Vibrissae

Mystacial: upper lips, usually arranged in well-defined rows. The top row (most dorsal) is labelled A, the next B, and so on to E as generally there are five rows present.

Rhinal: dorsum of muzzle, caudal to the rhinarium.

Submental: lower lip and chin; symmetry not generally apparent.

Interramal: one or more (may occur in a tuft) caudal to the mandibular symphysis; symmetry not generally apparent.

Superciliary (Supraorbital): tuft over each eye, usually above its medial part.

Subocular (Suborbital): beneath the eye.

Genal: one or two tufts in the area of the cheek. Upper genal are caudal to the eye, lower genal are caudal to the angle of the jaw.

Body Vibrissae

Ulnar-carpal: one or more on the palmar surface of the forearm near the wrist.