MOVEMENT OF SENSORY HAIRS IN THE EAR

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The movement of hair cells from the canal of the ear of *Petromyzon marinus* was recorded by Ecker (1844). He found, within the labyrinth, certain cells, each of which bore a single ciliary process, and reported activity upon the part of such processes. There appears to be no mention, however, of whether these motile hairs formed definitely a part of the neuro-epithelial region of the crista, or came from other parts of the membranous labyrinth.

In previous reports (Bowen, 1931, 1932), I have described the movement of sensory hairs from the ear of the common horned-pout, *Ameiurus nebulosus*. Such movement was witnessed in some, though by no means all of the preparations which showed the crista in fresh condition. This activity proved usually to be a definite, whip-like lashing, or wave-like motion in which the whole hair, from base to tip, was involved. In one of the ampullae from *Ameiurus*, hairs were found to be beating in such unison as to suggest some form of coördination. No indication was noted of any definite length of time during which motion might continue, nor did there seem to be any regularity as to periods of movement and of rest.

Investigations have recently been made of the ampullar organs of two Bermuda fishes, the squirrel fish, *Holocentrus ascensionis*, and the blue-striped grunt, *Haemulon sciurus*. These marine teleosts are both common in the Bermuda waters. It was found possible, by employing methods which have been noted in my earlier reports, to see the sensory hairs of the crista clearly and to hold them in living condition for some hours.

In one preparation from the squirrel fish, definite movement of the so-called sensory hairs was observed. The hairs in this case were apparently undisturbed by the dissection, and seemed, in all detectable respects, to be a part of uninjured tissue. The activity of the hair cells which was observed in this crista from the squirrel fish was somewhat less than I have witnessed in preparations from the *Ameiurus nebulosus*. There were no vigorous lashings here, though the amplitude of motion was wide enough to render the fact of movement itself clear and unmistakable. The crista had been kept in saline solution sufficiently long that no diffusion currents could be held responsible for the motion, and the preparation was so mounted that other currents, such as those due to movement of air in the vicinity of the preparation, were avoided.

In this crista, several hairs were moving, but they were not so situated as to make possible a determination as to coördination. The rate of move-

ment was less rapid than I have witnessed in *Ameiurus*, being here on the order of 125 beats per minute, as compared with a maximum of near 300 in the catfish.

In two dissections from the blue-striped grunt, movement of sensory hairs was observed. In one of these preparations, two hairs only were moving and, again, not with the activity shown by some specimens from *Ameiurus*, but with a wave-like movement still sufficient in amplitude to show that the movement was on the part of the hairs themselves. The arc through which the tip of the hair moved was somewhat more than half the length of the process itself.

In another crista from the blue-striped grunt, a distinct lashing of a single hair was observed. This activity occurred at the base of the proximal side of the mound of neuro-epithelial tissue which, in this species, is found near the center of the crista. This action continued for about ten minutes from the time it first came under observation, movement in this case being a distinct lashing in which the whole hair, from base to tip, participated.

These observations, one group from a fresh-water teleost, and the other two from marine forms, indicate that the phenomenon of movement of the so-called hairs within the ear is not limited to a single species and, it is suggested, may be found throughout a wide range of animal forms. In so far as I have record, there has been no mention of movement on the part of the sensory processes of the ear in any class above the fishes.

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