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The growth associated protein GAP43 is expressed in growing axons and during synaptic remodeling. Recent work has shown that new hair cells in BWS canary papillae are continuously being produced while the same or other hair cells are subsequently being lost. This continuous turn over of hair cells should be associated with an ongoing remodeling of basilar papilla innervation. In addition, it is of interest to know whether this peripheral remodeling is also associated with changes in the central projection areas of the auditory nerve fibers (Nucleus angularis NA and Nucleus magnocellularis NM) and a second order nucleus (Nucleus angularis NL) corresponding to the mammalian medial superior olive.

Frontal 10mm cryostat sections through the brainstem were collected in 5 alternating series on coated slides and air dried. One set was Nissl stained and 2 other sets were stained with a GAP43 antibody (Sigma G9264) using a biotinylated secondary antibody and an ABC reaction with DAB as chromogene. The brainstem and the cerebellum showed a differentiated GAP43 expression which was not systematically different in normal canaries compared with BWS canaries. The auditory brainstem nuclei NA, NM and NL were quite prominent in these sections due to the very low staining intensity compared to neighboring structures.

In normal canaries we found no sign of GAP43 labelling in either of the 3 nuclei, even at high magnification. The same was true for NM and NL in BWS canaries. However, in the NA of all three BWS we found distinctly labelled structures, puncta and occasionally fine fibers. These observations suggest that the three main auditory brainstem nuclei are "hard-wired" in normal adult birds. The presence of GAP43 expression in the NA of BWS canaries, on the other hand, suggests some degree of ongoing synaptic remodeling in this nucleus.

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